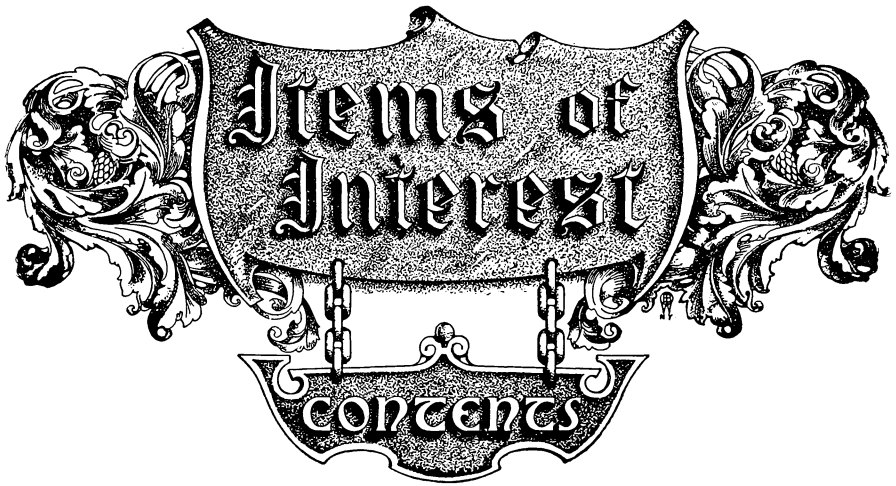

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Subscriptions received at any time, to date from January or July. Advertising rates made known on application. Remittances preferred by registered letter, postal money-order, or bank draft.

Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Minor and Major Oral Surgery.*

By Morris I. Schamberg, D.D.S., M.D., New York.

Professor of Oral Surgery, Dental Department, Medico-Chirurgical College of Philadelphia.

Surgical Pathology.

Derivation. Pathology (πάθος, disease, and λόγος, science).

Definition. Pathology is the science which treats of the knowledge of disease. Disease (Latin *dis,* negative, and *ease,* a state of rest) is a derangement of the vital functions; a disturbance of the normal manifestations of life; a deviation from health.

Synonyms. Disorder, malady, affection, sickness.

Varieties. Diseases are classified as local and constitutional or systemic; as medical and surgical; as acute and chronic; as functional and structural; as contagious and infectious; and as oral, dental, gastric, intestinal, etc., according to the part involved.

The structural changes produced by disease manifest themselves in the functional modifications which are known to us as symptoms. These symptoms are subjective, or those which are self-evident to the patient,

presenting in the form of sensations, pain, etc.; and objective, or those which are detected upon examination, *e. g.*, fluctuation of an abscess, crepitation in a fracture.

Etiology is the study of the causation of disease. The etiological factors in the production of disease may be classed as predisposing and exciting causes.

Treatment of disease may be divided into prophylactic, palliative and curative forms. Prophylactic treatment aims to prevent disease. Palliative treatment is directed toward the relief of symptoms. Curative treatment is applied to eradicate the disease by removal of the cause.

To properly study the causes of disease the student must first acquaint himself with the minute or microscopical appearance of healthy tissues and organs (histology), as well as their macroscopical arrangement (anatomy). The blood current through which tissues are nourished is usually the primary seat of pathological change.

Hyperemia is an excessive amount of blood in a part. It may be transitory or persistent. Examples of the transitory variety are the emotional blush of modesty or conviction, and the congestion of erectile tissues of the nose and penis during sexual excitement. These may be spoken of as physiological hyperemias in contrast to those forms of persistent congestion that result in pathological changes in the form of inflammation and hypertrophy. Active hyperemia is due to a too free access of arterial blood to the part, whereas passive hyperemia is the retention in the part of an excess of blood owing to an interference with the venous flow.

Ischemia is a term signifying an abnormally small amount of blood in the part. It may likewise be transitory and persistent. Examples of transitory ischemia are the conditions brought about by shock, such as syncope (fainting), with its accompanying pallor. Persistent ischemia results in degeneration and atrophy. Anemia refers to an insufficient amount of blood in the system, or in a deficiency in the red corpuscles or hemoglobin, or a disproportion between the number of red and white corpuscles. Plethora is a reverse condition, or an excess of blood in the system.

Inflammation.

Inflammation is a pathologic hyperemia, the result of irritation, and is accompanied by structural and functional changes in the part affected. All tissues of the body are susceptible to this abnormal condition, a thorough knowledge of which, in all its phases, is essential to a correct conception of surgical pathology.

Derivation. The term inflammation is derived from the Latin *inflammatis, inflammis* (to set on fire).

Definition. Inflammation is the reaction of living tissue to an irritant. It is characterized by the well known cardinal symptoms described by Celsus as *color, rubor, dolor* and *tumor,* translated into English meaning heat, redness, pain and swelling. Inflammation, then, is a series of circulatory and tissue changes produced during an effort at vital protection, and is manifested by one or more of the symptoms of heat, redness, pain, swelling and disordered function.

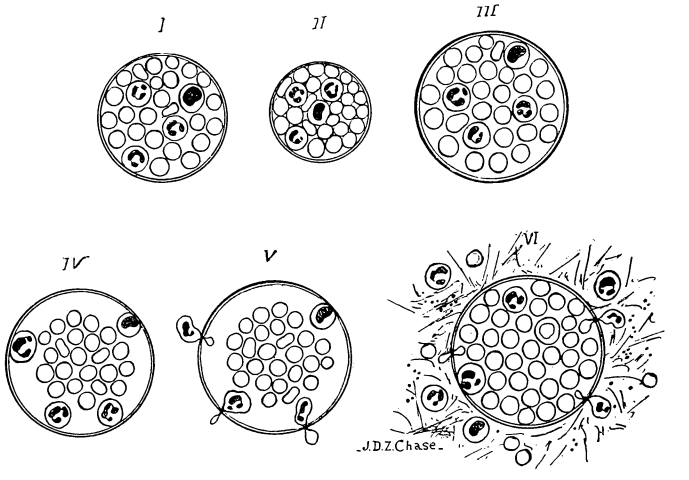


FIG. 1.

Etiology. *Irritants* are the invariable causes of inflammation. They may be classed as mechanical, chemical, bacterial and thermal.

Mechanical irritants are those which mechanically excite a part. Examples: Traumatism, the effect of a blow or injury, the presence of a splinter in a finger, a foreign body in the eye, the pressure of a particle of food on an exposed pulp of a tooth, contact with a sharp edge of a tooth or a rough point of an artificial denture.

Chemical irritants are those which, through the medium of their chemical action upon tissues, produce irritation. Examples: Strong acids or alkalis, cantharides, iodin, etc.

Bacterial irritants are the various micro-organisms which invade the system and produce through their presence, or the action of their by-products or toxins, pathogenic and pyogenic changes. Examples: Infection through the end of a tooth resulting in an abscess; auto-intoxication from pathogenic organisms in the intestinal tract.

Thermal irritants are those which act through the medium of extremes in temperature. Examples: Intense heat resulting in a burn, or extreme cold creating frost-bite.

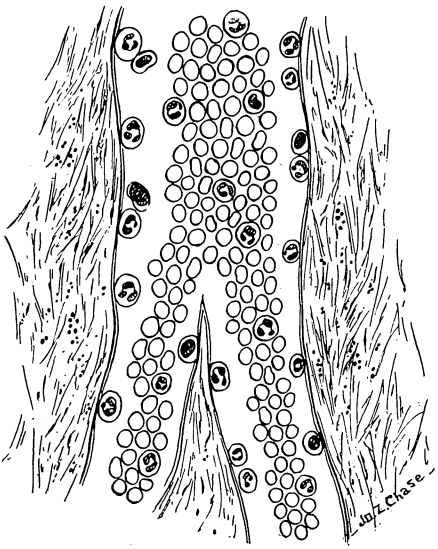


FIG. 2.—The early stage of inflammation. The red-blood corpuscles have taken to the center of the stream while the white corpuscles have drifted peripherally and are clinging to the blood-vessel wall.

Pathology of Inflammation.

Whenever irritation is applied to living tissue there are certain changes which take place in the vascular supply of the part. These may be studied by examining miscroscopically the ear of a live rabbit or the mesentery of one of the lower animals used for scientific study. The schematic drawing, Fig. 1, shows the various steps which mark the changes in a blood-vessel during inflammation.

No. 1 represents a normal blood-vessel, as to the caliber and the arrangement of the contained corpuscles.

No. 2. Momentary contraction or reduction in the caliber due to the first impulse of irritation.

No. 3. Dilatation to a point beyond the normal caliber to accommodate the increased quantity of blood in the part.

No. 4. Assembling of red blood corpuscles in the center of the stream with a peripheral drift of the white corpuscles.

No. 5. Emigration of the white corpuscles or leukocytes.

No. 6. Stasis of the blood stream—during which there is diapedesis of the red corpuscles, together with a passage into the surrounding tissue of the white corpuscles and the exudation of liquor sanguinis.

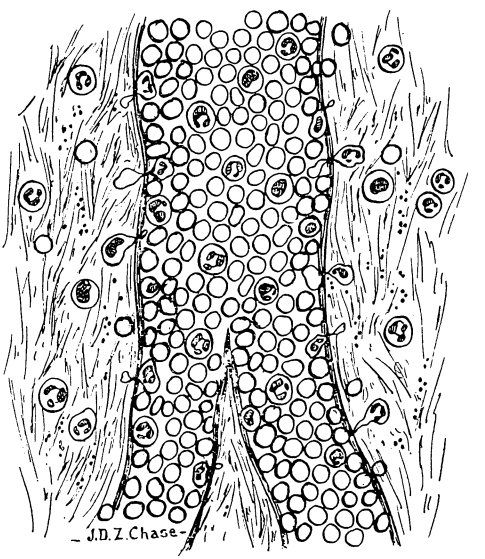


FIG. 3.—The stage of congestion in a blood-vessel, during which not alone the white-blood corpuscles pass out into the surrounding tissue, but there is diapedesis of the red corpuscles and an exudation of plasma.

The passage of the white blood corpuscles or leukocytes into the perivascular tissue is an effort on the part of nature to combat the irritant. They pass through the vessel wall by ameboid movement. *Chemotaxis* is a term applied to the property that certain bodies possess of attracting or repelling leukocytes. Positive chemotaxis applies to the attractive, and negative chemotaxis to the repellant force. Bacteria generally are positive chemotactic, and this is strongly evident in pyogenic organisms. As early as ten hours after the invasion of tissue by a pus-producing organism we may find a dense accumulation of white blood corpuscles in the part. This is known in the vernacular of the microscopist as round cell infiltration. These round cells or leukocytes endeavor to envelop and destroy the offending organisms. When this is accomplished resolution, or a gradual restoration to the normal, takes place. When the

organisms are victorious suppuration or death of the part is the result. Resolution is greatly assisted by the lymphatic system, which resorbs and carries off the inflammatory debris.

Varieties. Acute and chronic, simple and suppurative, parenchymatous and interstitial, catarrhal and serous.

An *acute inflammation* is that form in which the etiological factors are sufficiently active or virulent to produce a disturbance which runs a rapid course, during which local and constitutional symptoms are pronounced.

Chronic inflammation is characterized by its long duration, mild symptoms and structural change of the affected part.

Simple inflammation is the result of mechanical, chemical or thermal irritants unaccompanied by bacterial invasion.

Suppurative inflammation follows the introduction of pyogenic organisms into the system, and is attended by pus formation.

Parenchymatous inflammation affects the parenchyma or active cells of an organ.

Interstitial inflammation involves chiefly the connective tissue.

Serous inflammation is the form which gives rise to profuse serous exudates.

Catarrhal inflammation affects mucous surfaces, causing a shedding of the epithelium.

The suffix *itis* applied to the name of a tissue or organ signifies an inflammation of that part; thus, pulpitis refers to an inflammation of the pulp; pericementitis, of the pericementum; stomatitis, of the mouth; gastritis, of the stomach; bronchitis, of the bronchi; appendicitis, of the appendix, etc.

Symptomatology. The symptoms of inflammation are those that are local and those that are constitutioal.

The local symptoms of (*color*) heat, (*rubor*) redness, (*dolor*) pain, (*tumor*) swelling and (*functio laesa*) altered function, are usually present to a greater or lesser degree. Oftentimes one or more of the symptoms may be but slightly evident, and in some instances absent or undiscernible.

The *heat* in an inflamed area is due to the active hyperemia or increased quantity of blood flowing through the part, and to the chemical changes which take place during an inflammatory process.

The *redness* in an inflamed area is due to the increased quantity of blood and the color that is imparted through the red blood corpuscles

with their contained hemoglobin. Pressure upon an inflammatory surface will cause a temporary blanching owing to the expulsion of the blood, followed by a rapid recurrence to redness when the finger is removed, due to the immediate return of the blood.

The *pain* as a result of inflammation is produced by pressure exerted upon the nerves and by the irritation of the chemical products of inflammation upon the terminal ends of nerves. The pain, though it is usually centered in the part affected, may be reflected in a manner to confuse and render difficult a correct diagnosis.

The *swelling* of an inflamed area is easily explained by the presence of an increased quantity of blood, to the proliferation of cells and to inflammatory edemas owing to the free exudation of plasma and the failure of the lymphatics to resorb the excess.

The *constitutional symptoms* are usually evident during acute inflammation, and are either absent or scarcely perceptible during chronic inflammatory processes. They consist of general malaise, headache, fever etc. When the fever is high, the headache and pain in the back and joints severe, the urine highly colored, the intestinal tract in a state of disorder, the tongue coated, etc., the source of irritation is usually some virulent pyogenic organism, the toxin of which is accountable for the fever and its concommitants.

Terminations of Inflammation.

Inflammation terminates in either resolution or death of the part. Resolution may take place with or without tissue changes. Mild inflammations of short duration are seldom attended by an alteration in the tissue or organ. Acute inflammation may become a subacute or chronic process. These types of inflammation usually result in tissue proliferation and degeneration.

When inflammation results in death of the part it does so in the form of suppuration, ulceration, necrosis, caries or gangrene.

Treatments of Inflammation.

The prophylactic treatment of inflammation consists of the prevention of those constitutional maladies, such as rheumatism, gout, diabetes, syphilis and tuberculosis, which predispose a patient to inflammatory disturbances: furthermore, the institution of hygienic measures which encourage the normal elimination of waste products from the system. In the mouth much can be accomplished in the prevention of inflammation by a systematic cleansing of the teeth and gums and the removal of any irritating influence such as salivary and serumal deposits and other oral debris, the elimination of sharp and irregular surfaces from carious teeth, artificial appliances, etc., the correction of dental irregularities, the removal of roots

of teeth which serve no useful purpose in the mouth, of impacted teeth and those which infringe upon soft tissue; in other words the creation of a healthy environment within the oral cavity.

Asepsis and antisepsis in their application to dentistry and surgery are potent factors in the prevention of inflammation.

Palliative treatment of inflammation consists of such measures for the relief of symptoms as counter irritation by means of the local application of capsicum plasters, iodin, etc., for the deep alveolar inflammations; the use of hot footbaths for the attraction of the blood to the extremities from the seat of inflammation; the administration of morphin, codein, etc., for the relief of the pain. These are palliative measures which are justifiable at times, but which, except in extremely rare cases, never effect a cure without more radical treatment. In mild cases the depleting influence of counter irritation is all that is required to re-establish a normal circulation in the part.

The curative treatment of inflammation aims primarily at the removal of the cause. When the cause is local, radical methods in the form of surgery are ofttimes indicated and bring about the most rapid restoration to the normal. When the cause is constitutional an absolute cure is not to be expected from local treatment. A syphilitic lesion in the mouth, for instance, though it may be benefited by topical applications, must receive the influence of specific treatment directed at the constitutional infection. Thus specific lesions fairly melt away under the administration of mercury in the early stages, and potassium iodid or the combination of the two in the later stages of the disease.

Tuberculosis, diabetes, rheumatism, gout, anemia, kidney affection, etc., all require special attention before the best results can be achieved with inflammatory lesions, whether they appear in the mouth or elsewhere.

Physiological rest is an important step toward the cure of inflammation. Examples: The prevention of occlusion of a tooth that is sore from an acute pericementitis; the non-use of the jaw during healing of a fracture; the rest given a limb during an inflammation of that part; the exclusion of light during an inflammation of the eye, etc.

Depletion of the affected part often assists in re-establishing the normal circulation in a part the seat of inflammation. This can be accomplished by cupping, leeching or scarification, but these methods have become obsolete owing to the unwarranted loss of blood.

Occasionally blood-letting can be practiced to advantage, but this is best accomplished through an incision made under aseptic conditions, free bleeding being encouraged by the use of warm water.

Counter irritation induced by cantharides, iodin, formalin, capsicum,

actual cautery, etc., will be found to be of distinct value in depleting the part through the attraction of the blood from the seat of inflammation to the area to which the counter irritant is applied.

Saline laxatives tend to deplete and improve inflamed parts. Elevation of the part is frequently accompanied by relief. The application of *cold* by means of an ice bag or cloths dipped in ice water and placed upon the part will be found to be of benefit in the early stages of inflammation, owing to its stimulating influence upon the overdistended blood-vessels. Suppurative inflammation about the mouth can occasionally be aborted by this means, or at least the tendency toward external pointing of the abscess prevented. Care must be exercised not to refrigerate to such an extent as to lower the vital resistance of the part. The application should therefore be made intermittently, and if an ice bag is used a damp cloth should be interposed between it and the patient.

Heat should be used guardedly about the mouth, for inflammation in this locality is usually suppurative and tends to extend under the influence of hot fomentations or poultices. The hot-water bag and other applications of heat to the external face have been accountable for many disfiguring scars.

The Principles and Practice of Filling Teeth with Porcelain.*

By Dr. John Q. Byram, Indianapolis, Ind.

Technique of Fusing Porcelain—Furnaces and Pyrometers.

The purity of colors of porcelain is partially dependent upon the accuracy of the fusing. The variation of heat of the muffle will cause differences in the shade of the porcelain. Under-fused porcelain is of a duller hue and less translucent; the blues appear lighter in color; the yellows, browns and grays appear darker than properly fused porcelain. Over-fused porcelain is much lighter in color and has more of a glass-like appearance.

If porcelain remain in contact with the maximum heat long enough, or if it is brought to the maximum fusing heat by repeated firing, it tends to form a glass-like mass. All the hues of a color from the normal to a light may be made from the same porcelain by increasing the heat

above its maximum fusing point, but this is done at the sacrifice of strength. This explains why each layer of enamel should be fired only to a high biscuit, and all the enamels to the point of glazing only at the final firing.

The method of fusing porcelain at its maximum temperature for a short time should be condemned. It makes the porcelain more brittle and causes the formation of minute bubbles throughout the mass. The porcelain should not be placed in an intensely hot furnace, for it causes a crust to be formed on the surface, which prevents the escape of gas. This gas will seek the point of least resistance, which will be along the margin, and result in the formation of bubbles along the margin of the inlay.

Furnaces. The three varieties of furnaces used in inlay work are the gas, gasolin and the electric. Gas furnaces have been used with but a moderate degree of success. In order to obtain a sufficient supply of air for proper combustion the use of a bellows or compressed air becomes necessary. The noise produced by the combustion is one of the objectionable features. The gasolin furnace is preferable to the gas furnace because it makes less noise, requires no special compressed air outfit and yields a more intense heat. The temperature obtainable in them is sufficient to fuse any of the foundation bodies. The muffles of gas and gasolin furnaces need careful watching, and just as soon as the continuity of the muffle is broken, it is absolutely necessary that a new one be inserted to prevent "gassing" of the porcelain. The two gasolin furnaces which deserve the most consideration are the Brophy (Fig. 116) and the Turner (Fig. 117). One of the principal disadvantages of the gasolin furnaces is the lack of convenient means of regulating the heat. Unless the muffle is kept at a high temperature it is hard to fuse high-fusing porcelains, and unless the porcelain is placed slowly into the muffle, its texture will be affected.

Since the introduction of the electric furnaces the fusing of porcelain has been much simplified. This style of furnace has the advantage in that the heat is not a product of direct combustion and precludes any possibility of "gassing" the porcelain. The heat is radiated from all sides within the oven. The porcelain can be placed directly into the muffle without previous heating. The current can be turned on gradually until enough heat units required to fire the porcelain have been obtained. The ease and accuracy with which the heat can be controlled is also a great advantage. The furnace is small and its operation is clean and noiseless, and it can be conveniently used in the operating room.

The fusing of porcelain is as exacting as any step in the construc-

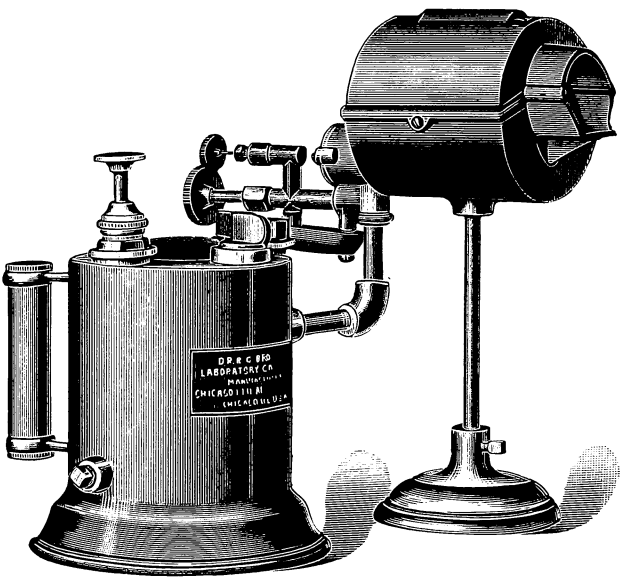


FIG. 116.

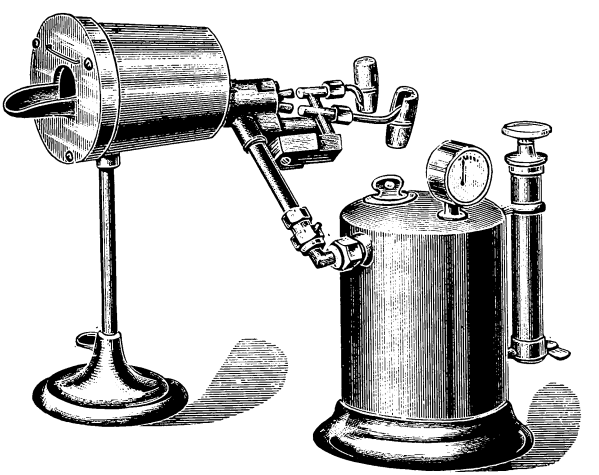


FIG. 117.

tion of the inlay. It is difficult to fuse porcelain definitely without some means of measuring the heat and many otherwise good inlays are spoiled in the furnace. Fairly accurate results may be obtained by placing a pellet of pure gold on the slab in the muffle of the furnace, increasing the resistance until the pellet melts, and maintaining the heat on a given button for the desired period.

Pyrometers.

Dr. D. O. M. Le Cron designed a form of pyrometer (Fig. 118) which gives more accurate results than the pure gold test. The device is exceedingly simple and the designer says of it:*

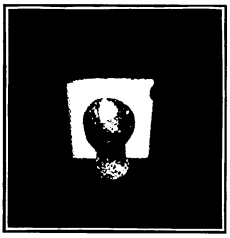


FIG. 118.

"A small cube of soapstone is excavated to resemble an hour glass; in the upper expanded cavity is placed a small spherical mass of an alloy composed of platinum and gold. The relative proportion of the two metals governs the fusing points of the alloy. By varying the proportions the temperature may be graduated to any extent within the limits desired. The proper temperature of fusing for a given body is matched with a pellet of alloy. The pyrometer is set in the muffle, and when the temperature at which the porcelain fuses has been reached, the little metal ball melts and runs down into the lower chamber." This method makes possible a fair degree of accuracy, provided it is used each time under similar conditions.

Since the introduction of electrical dental pyrometers, the fusing of porcelain has been simplified, and positive results can be obtained. To Dr. W. A. Price, of Cleveland, belongs the credit of placing the first electric dental pyrometer on the market. The pyrometer designed by Dr. Price depends upon the principle of the thermo-pile or the thermo-couple system.

*"The American Textbook of Prosthetic Dentistry."

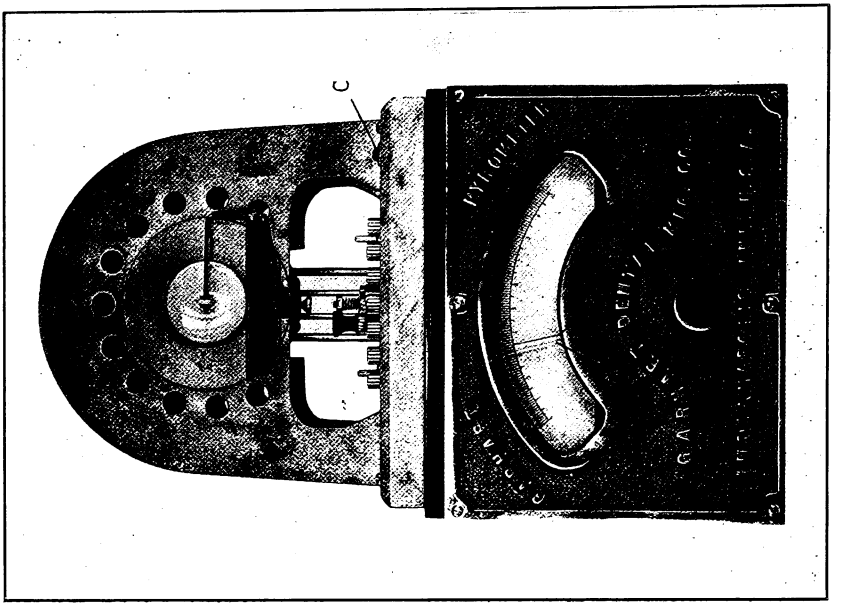


FIG. 120.

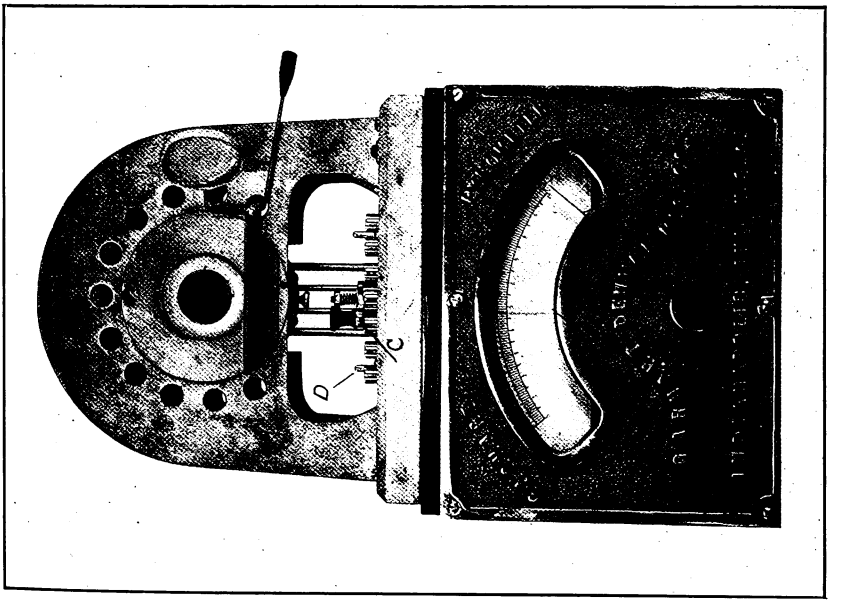


FIG. 119.

The "thermo-couple system" is the one generally used by the manufacturers of dental pyrometers. The pyrometer may be divided into two parts, the first being the "thermo-couple," or portion that is introduced into the muffle of the furnace, and second, the milli-ammeter or milli-voltameter that registers the temperature of the muffle. The "thermo-couple" is usually composed of a small spherical shaped mass of rhodium, to which is attached two heavy platinum lead wires. In some instances

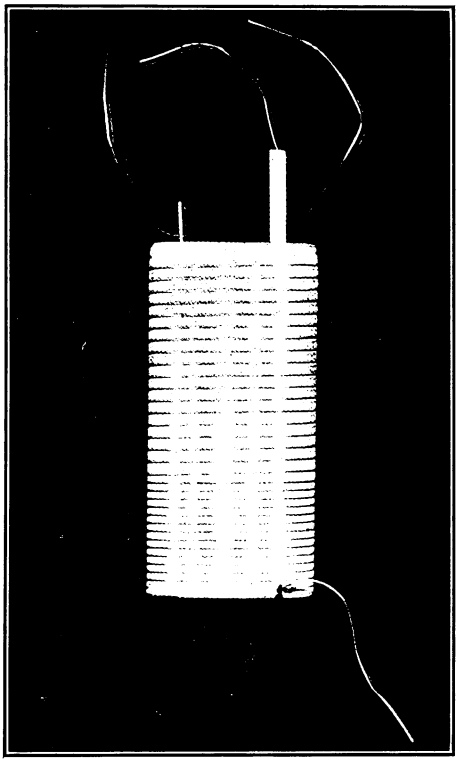


FIG. 121.

two of these elements are used or connected in series in order to secure a greater volume of current for the purpose of actuating the recording instrument. This element is a miniature heat battery, that is, when it is exposed to heat it will generate a feeble current which increases or decreases according to the variations of temperature that takes place within the muffle. This feeble current so generated is in turn measured

by the milli-voltameter. When operated under certain conditions this system is quite accurate. To operate it so that it is perfectly accurate, the wires leading from the "thermo-couple" should be kept cold by artificial refrigeration. If these wires are permitted to heat up, the "thermo-couple" loses in its efficiency to generate the same intensity of current. One other point to bear in mind is the accuracy of the milli-voltameter which must be so designed as to be extremely sensitive in registering

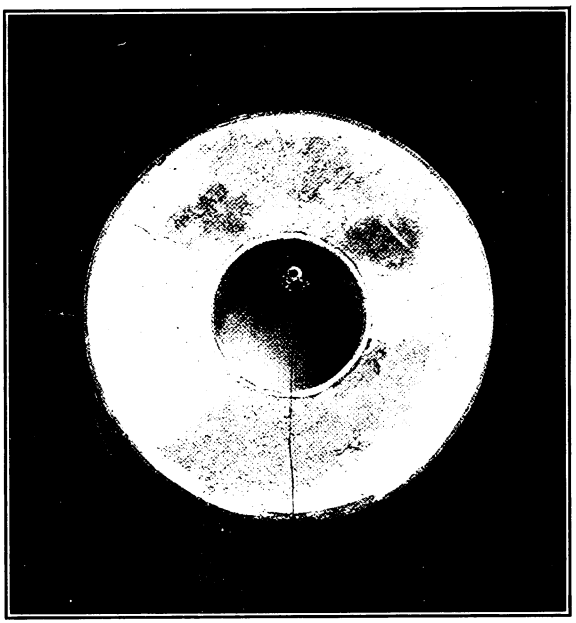


FIG. 122.

every minute variation of current change that takes place in the "thermo-couple." It should be accurately adjusted or standarized at least once a year.

The pyrometer designed by Mr. N. K. Garhart (Fig. 119) operates on an entirely different principle from the "thermo-couple system." The inventor took advantage of a special feature possessed by the "Nernst glower," The "Nernst glower" is a miniature rod that is used for electric lighting and was confined to that use solely by its inventor, Mr. Nernst. This element is made up of the oxids of the rare earths such as are used in the manufacture of Welsbach gas mantels. These earths are fused into two miniature rods which resemble fused porcelain in ap-

pearance. To both ends of these two rods are fused platinum lead wires for conveying the current to the "glower." These glowers have the peculiar property of changing in resistance to conductivity of the current according to the temperature to which they are exposed. To illustrate this point more clearly, the "Nernst glower" is a perfect non-conductor when cold, but when heated it becomes a conductor of the electric current, and its conductivity increases as the temperature to which it is exposed increases. By placing one or more of these glowers in the

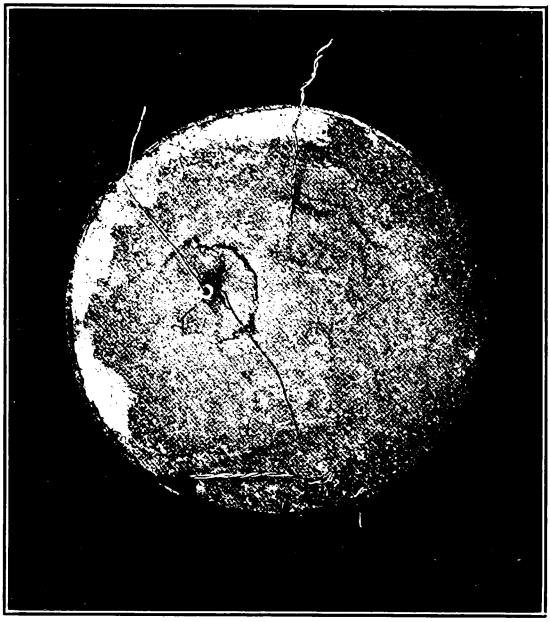


FIG. 123.

muffle (Fig. 122) and connecting them in series with a milli-voltameter which is also in series with a stable low voltage circuit, the heat of the muffle is recorded. The amount of current that is required to actuate the instrument is very small; hence a stable unvarying current supply is secured with three ordinary dry cells. These cells will maintain this form of pyrometer in an accurate condition for a period of at least one year. In connection with this pyrometer there is a means by which the accuracy of the instrument may be instantly tested before each firing. There is interposed in the battery and instrument circuit a resistance coil operated by a small push button switch. By merely pressing on this

switch the pyrometer hand will ascend the scale to a certain reading which indicates the accuracy of the instrument (Fig. 119A). If the reading on the scale shows a falling off it is evident that three new cells should replace the old ones. This test must always be made when the furnace is cold.

The "glower" that is placed within the muffle does not undergo any change, for it conducts only a very feeble current and thus there is practically no element or source of inaccuracy from its use. With every muffle renewal new glowers are supplied, hence the accuracy of this system is fully maintained. Experience in the use of new muffles also has proven that there is no variation in one set of glowers as compared with another. Another strong feature about this system is the fact that a more stable recording instrument is employed.

The inventor devised this style of pyrometer in order to perfect a pyrometer furnace that would be automatic in the fusing of porcelain, for the "thermo-couple" system, he says, is impracticable for this purpose. His furnace is at present the only one that is truly automatic in its working properties, and at the same time scientifically accurate in results.

The muffle construction is decidedly novel and unique. The outer casing is a three-inch seamless brass tubing, which is placed in a steel mold and filled with damp fireclay under hydraulic pressure. The muffle proper is made from a special impervious snow white berline porcelain. It is cylindrical in shape and is grooved on the outside as shown in Fig. 121. This figure also shows the thin shell of chamber mounted on a special mandrel with the wire wound in the grooves. Figs. 122 and 123 show the finished muffle, giving a front and rear view of same. Fig. 123 shows the main resistance wires and the wires leading from the glowers. The most important feature concerning the construction of the muffle lies in the manner by which the inner chamber and platinum wireing are invested in the fireclay or outer chamber. There is a space, approximating about one-quarter of an inch between the platinum wire and the fireclay chamber which is filled with very finely powdered silex. The soft powder permits the wire to expand and contract freely and at the same time removes all danger of contamination of the fireclay affecting it. The front and rear of the muffle are sealed to a depth of three-sixteenths of an inch with fireclay. Another notable feature is winding of the wire about the inner porcelain shell. The coils are nearer together at the front than in the rear (Fig. 121) so as to make the temperature more nearly the same in the front section as that of the rear portion of the muffle.

In the operation of the furnace attention is called to Fig. 119B, which is the secondary hand of the pyrometer section. By turning this

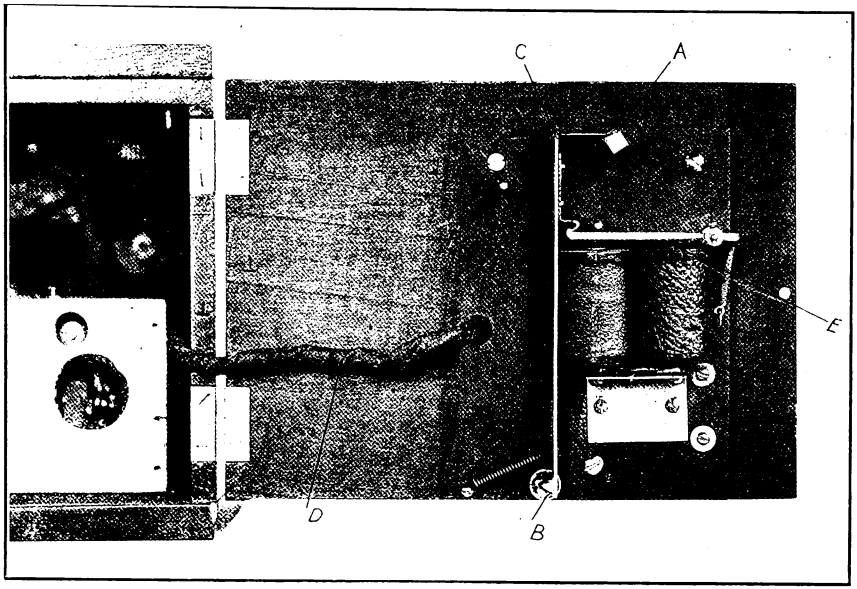


FIG. 124.

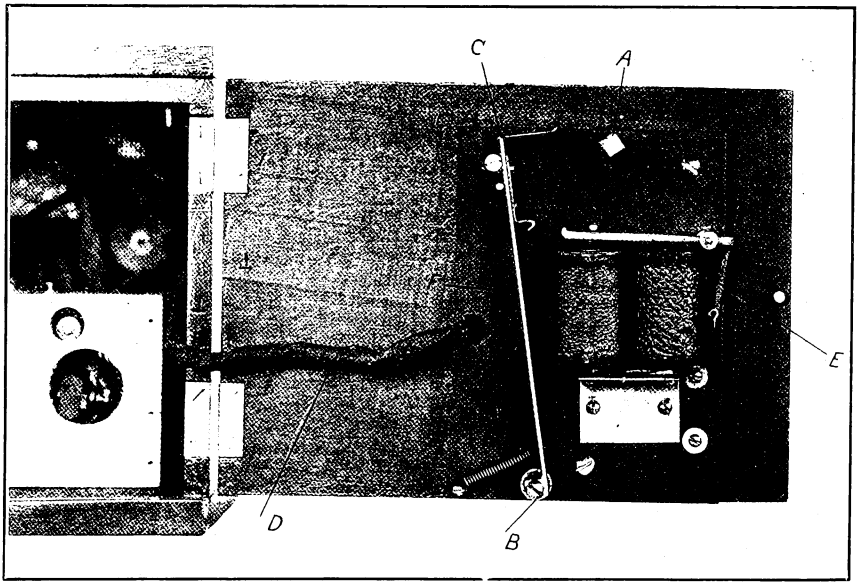


FIG. 125.

hand to any point on the scale (Fig. 120B) the furnace will instantly stop heating when the "recording hand" (Fig. 120A) comes in contact with it. If the operator does not wish to use this "automatic feature" the furnace may be operated as an ordinary pyrometer furnace by moving the "secondary hand" (Fig. 119B) to some point near No. 10 on the scale. The current may be cut out by pressing down on the small button

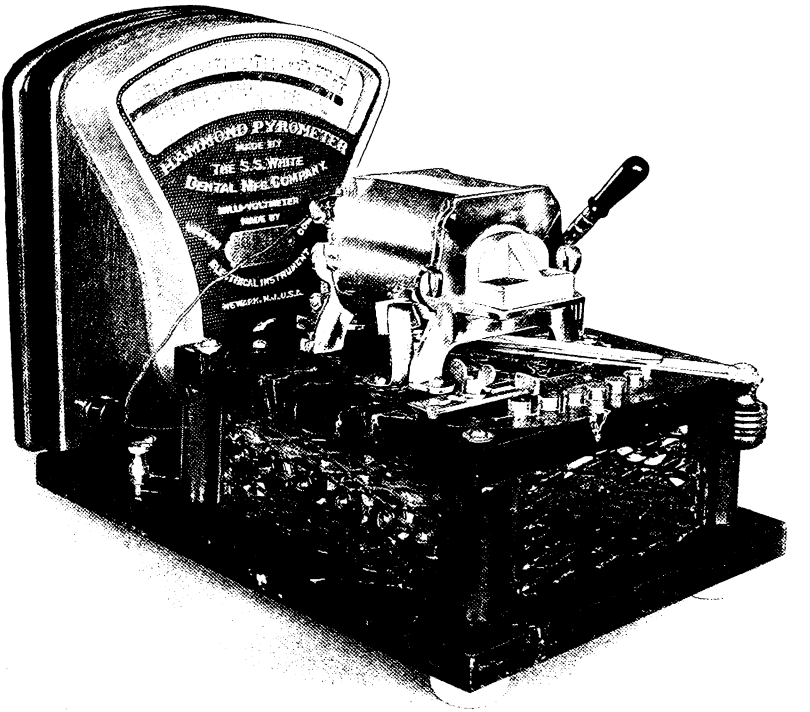


FIG. 126.

switch (Fig. 120C), which is located on the right-hand corner of the marble base on which the furnace is mounted.

The furnace is started by moving the main lever (Fig. 119C) to the left until it touches *stop* "D," at which point it is released and automatically moves over to the second contact. This is the lowest heat contact that the furnace is capable of giving. A notable feature is the fact that the furnace can not be accidentally started while the lever is resting on the higher heat contacts. The operator is always required to move the lever to the extreme left side or until it touches the *stop* "D."

Figs. 124 and 125 show the operation of the magnetic cut-off switch. Fig. 124A shows the switch closed and Fig 125C shows it after the circuit is opened. The terminals of switch are protected with heavy platinum contacts and the breaking of the circuit is accomplished through the magnet E, in an instantaneous manner. D shows the wires leading from main current to the terminals of the magnetic cut-off at A and B. F shows the steel bar, which, when in contact with A, completes the circuit.

Fig. 126 shows the Hammond pyrometer furnace and Fig 128 shows the pyrometer designed by Dr. Marshall Weaver, of Cleveland, and

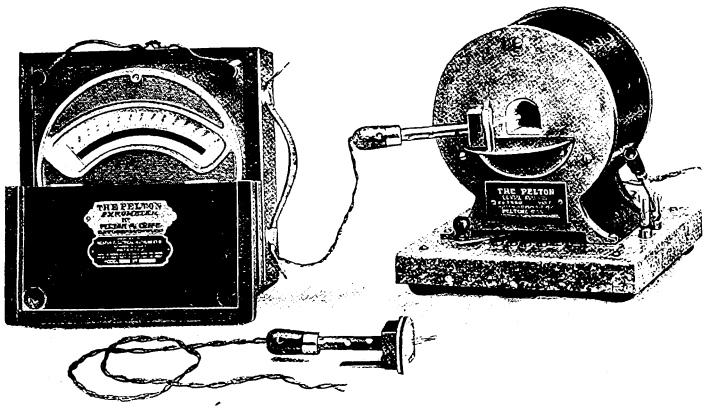


FIG. 127.

attached to the Pelton furnace. This pyrometer has an advantage that it may be attached to any furnace. These pyrometers are constructed with the thermo-couple system. While these instruments record both temperature and resistance on the face of the milli-ammeter, the temperature scale is of no special value in fusing the porcelain. It must be borne in mind that porcelain has no definite fusing point, as a piece of metal has, and the mere fact of heating the furnace up to the degree of heat indicated on the scale for the fusing of a given porcelain will not necessarily cause the porcelain to fuse. Time is a large factor in the fusing of porcelain, and unless sufficient time is given the porcelain will not be properly fused. If, on the other hand, too much time is consumed when the porcelain is heated to the point of high biscuit, it will become over-fused. It is just as well to fuse the porcelain at a given point of resistance on the scale as to fuse it at a given temperature point.

These two pyrometers have the disadvantage of needing to be constantly watched, and many inlays have been spoiled with this style of pyrometer furnace because the heat has been carried beyond the point required to fuse the porcelain, or the inlay is left at the maximum heat required to fuse it for too great a length of time. If this style of pyro-

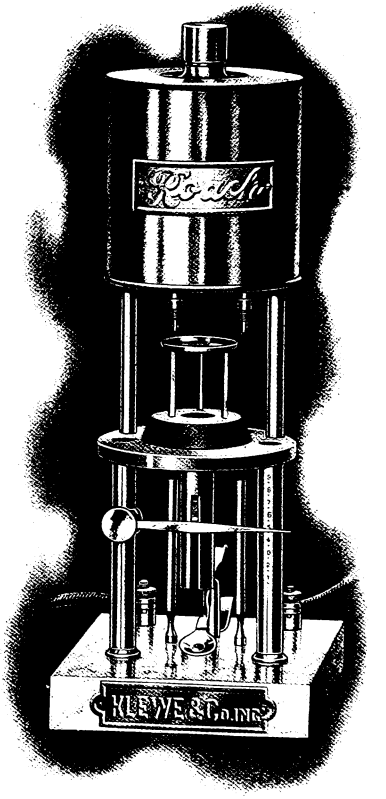


FIG. 128.

meter is used, the operator should pay strict attention to the instrument when the heat becomes sufficient to hard-biscuit the porcelain.

The Roach automatic furnace (Fig. 128) is constructed on a different principle. A small lead plug makes the connection just below the muffle and completes the circuit. When sufficient heat is obtained the plug melts and breaks the circuit. The degree of heat is regulated by the distance the plug is placed from the muffle. A series of figures are

placed on one of the supports, and by raising or lowering the arm, the temperature is changed. The lower the arm is placed the more heat is required to fuse the plug. While this furnace is accurate for low-fusing porcelain it seems to be less reliable for high-fusing porcelain, unless the plugs are made of a higher-fusing metal. The base of the furnace becomes hot when used for high-fusing porcelain; it retains so much heat that the lead plug melts before sufficient heat is obtained to fuse some high-fusing porcelains.

Technique of Fusing Porcelains.

The muffle should first be heated to at least 2,000° F. in order that the fireclay casing may become hot. The lever should be brought back to the first button of the rheostat. When the work is ready to be placed into the muffle the current should be turned off and the muffle permitted to cool until the redness has disappeared. The porcelain should then be placed into the muffle and the current turned on. The heat should be increased gradually. If an electric pyrometer is used the needle should move slowly, and when all the heat is obtained from a given resistance the lever should be moved to the next button. When the needle of the milli-ammeter registers at the proper point for the fusing of a given porcelain the current is shut off. If the Garhart automatic pyrometer is used the secondary hand is set at the point at which the porcelain is to fuse. The rheostat lever is moved gradually until it has reached the button required to fuse the porcelain, after which no further attention is required, for the current is automatically cut out when the pyrometer hand and the secondary hand come in contact. The author has used this automatic furnace more than three thousand times and it has never failed to cut out the current at the proper time.

It must be borne in mind that pyrometer furnaces are not accurate unless they are manipulated under uniform conditions. The following points should be observed in fusing porcclain. Always heat the muffle previous to firing the porcelain. Never place the porcelain in an intensely hot furnace. Heat the porcelain slowly. Run the pyrometer under similar conditions for each firing. Do not try to fuse porcelain and do other things at the same time unless an automatic pyrometer furnace is being used.

A complex inlay should be tried into the cavity before the matrix is removed; for in many instances it is necessary to grind the inlay to proper occlusion. This can be accomplished best by testing with carbon paper and grinding at such points as are indicated by spots on the porcelain. The incisal edge should be ground to proper length and contour. After this necessary grinding the inlay should be thoroughly cleansed and then fired to a high biscuit.

EXCLUSIVE CONTRIBUTIONS

Vaporous Urine and Its Evil Results.

By Dr. U. M. Seeger, Louisville, Ky.

I invite attention to a new theory I have regarding the origin of uric acid in the body and local points, causing spongy gums, loose teeth, absorption of the maxillaries as well as affecting the bony and soft tissues. The absorption of the fangs in whole, or part, has come within the range of my experience, and I have seen the permanent teeth drop out like the deciduous set. I have seen the spongy gum extending well back and involving the throat and palate, also the tongue, and even affecting the middle ear by way of the eustachian tube, causing nasal catarrh, and in its obstructions affecting the eye.

The stomach also receives its share of uric acid by which means it gains access to the liver and the blood. The blood becoming overcharged with uric acid, the poison is carried to weak points of the body producing its reflex aches and pains, called rheumatism. Some are immune, or seem to be so, though about this I have doubts, while others absorb it until thoroughly bloated from its effects, requiring the most observant attention and persistent treatment to counteract the evil results.

The system, as well as the blood, being overcharged with uric acid, there is refiltration through the kidneys, which become surcharged with a resultant calcareous effect upon the filter plant of the kidneys, causing gravel; there is correspondingly the same calcic precipitant effect as upon the teeth, also acting similarly in the bladder.

Etiology of Uric Acid Deposits.

Now, as to the cause of these surcharged conditions it has long remained a puzzle. During my experience of thirty years as a dentist, I was never so taken by surprise as when scaling a lady's teeth, some four or five years ago; I detected a peculiar odor upon her breath. I watched for it a second time. After that it was not necessary, for it was there in force. It was the odor of urine on the breath, unmistakably. Now, the question is, how did it get there? After some questioning of the patient and much thought, I came to my conclusion that it must have been by inhalation. But how and where? My solution of the problem was to fix the responsibility upon the bedroom and the uncovered urinal. And this takes us back generations, for our ancestors through ignorance of hygiene have handed down this source of infection, the night vessel, from father to son to the present time. This, to my mind, accounts in a measure for the debilitated con-

dition of the human race. Beginning with our babyhood we are subjected to its evil influences, spending one-third of our lives within the realm of its pernicious, vapor-exhaling activity.

We find the calcareous condition of the teeth caused by uric acid deposits, carried there, in my opinion, by impregnation of the mucus of the nasal passage during sleep by the poisoned atmosphere of the bedchamber, due to the presence of the open night vessel. This vapor, condensing in the nasal fossa, is swallowed into the stomach, causing a catarrhal condition, and mixed with the chime is carried into the liver where it produces the same calcic effects, resulting in gall stones and kindred troubles. By the blood it is carried to all parts of the body, producing a bloated condition in some and a depleted condition in others.

In some cases I have found pinhead eruptions under the skin accompanying the bloating, the sufferers complaining of almost constant headache. By placing such cases under proper treatment for uric acid the trouble was corrected. In several of these cases the patients were sisters, indicating a similarity of causes, and strengthening my theory as to the origin. Upon all of these the odor of urine could be plainly detected upon the breath. Since I have been making this investigation I have discovered the odor of urine upon the breath of many. In one case a lady, who suffered for months in bed with rheumatism, came to me to have her teeth treated. In scaling the tartar I found a recession of the gums to quite an extent, also a spongy condition of the same with a slight exudation of pus. The odor of urine was very perceptible upon the breath. Again I was able to trace the cause to the night vessel.

The physician is right when he says rheumatism is caused by a surplus of uric acid in the blood, but the medical text books have not told how it enters the system, at least not to my full satisfaction, nor has the symptom of the odor of urine upon the breath been given attention either in colleges of medicine or dentistry.

I had one case in which a lady, who kept her teeth and gums in apparently a healthy condition and whose breath was sweet, who suffered from nervous prostration, neuralgia and headache. In scaling her teeth I did not find any tartar of consequence about the anterior fourteen teeth owing to the exceptionally good care given them, but about the third molars the gums were in a spongy condition and the tartar present indicated uric acid. My suspicion was aroused and was confirmed by the detection of the odor of urine during a coughing spell. Again I traced the open night vessel in the bedroom.

To summarize, my theory is this: The oxygen of the air which is taken up by the blood is charged with vaporous urine which gets into the human system, first by inhalation into the lungs, and second

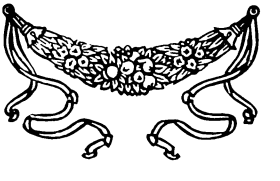
by condensation in the nasal fossa, whence it is swallowed into the stomach, thus having access to all of the vital organs, and producing an excess of urine in the system, which makes the conditions abnormal and setting free the uric acid.

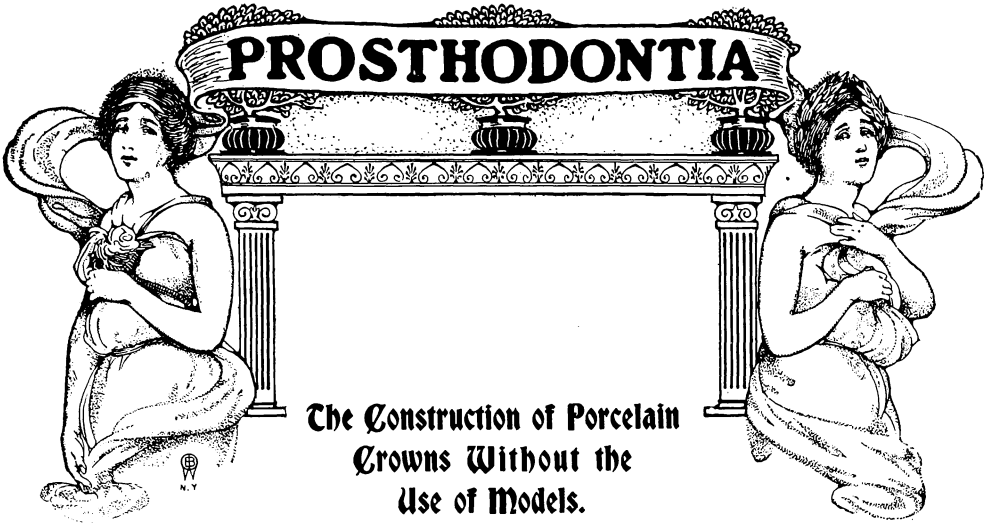
Uric acid is a poison that has gathered its victims in greater numbers than all the wars of history, for the latter have their beginnings and endings, whereas the former collects a daily toll. It is the greatest scourge of the human race, and for humanity's sake I hope we have discovered one, and I believe its principal source of being set free in the body.

I know it will be difficult to divorce us from the night vessel, we have been so accustomed to its convenience. But we need not banish it altogether, though we should put the lid on tight. The bedroom carelessness, or rather, I should say ignorance and negligence, must be abated to relieve the situation. At the same time it is important that urinals in private houses and public places be not permitted to pollute the atmosphere with their disease-bearing vapors, but should be looked after carefully as to their sanitary condition, for not alone vaporous urine, but other poisons emanating from them may find their way into the system through inhalation.

Why are consumptives advised to sleep in the open air? Perhaps if indoor sleeping had been done under proper hygienic conditions, consumption would not have become the great white plague it is. Nor Bright's disease, diabetes and uremia.

I know I have ventured into a new field of inquiry and that in advancing my theory I invite attack, even ridicule, and may have to ride the sharp backbone of contrary opinion, but my views are submitted with the hope that something may be done to route the arch foe of the human family—old uric acid.





The Construction of Porcelain Crowns Without the Use of Models.

By Henry H. Tompkins, D.D.S., Utica, N. Y.

Read before the Second District Dental Society, November, 1907.

Not long ago, when conversing with the president of one of the largest manufacturing interests in the city in which I live, he told me that if anyone would bring him a machine which would save one-half cent per dozen on the output of his factory, he would dispose of any piece of machinery in the entire plant and replace it with a new one. This suggests the great values which aggregate from small savings. Everyone can not come to a society meeting like this, as Dr. Taggart did last year, and present methods which are revolutionary in character. Most of us will have to be satisfied with more humble attainments and, if I shall bring to your notice methods which will save a considerable amount of time in your every-day work, you will, in a measure, be compensated for the time you are spending and the inconvenience of coming here this evening.

My talk will be largely along the well beaten lines of daily practice; it must necessarily be so. However, I shall make some suggestions which seem to be of importance and it is possible I may just whisper a protest against some of the theories regarding the manipulation and fusing of porcelain generally entertained by the profession. I would like to turn this occasion if I can into a sort of experience meeting, and consider the entire subject of crown construction.

Bands Not Necessary.

In this audience one certainly ought to apologize for mentioning the topic of bands. However desirable they may be in making extended bridges, there certainly is no good reason for their use in connection with one-piece construction. It is much better to rely for strength upon a properly shaped post of sufficient size than to subject the patient to the pain usually caused in reversing the bevel of the root, in order to properly fit the band. So far as the protection of the root is concerned, it does not need a band for that purpose any more than its neighbor needs one, and

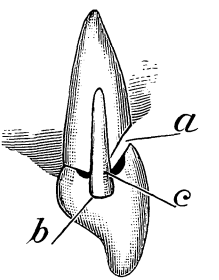


FIG. 1.

in the event of the root decaying, at some subsequent time, it is to be treated exactly as though it carried a natural crown instead of a porcelain one.

It is also unnecessary to suggest the many advantages which porcelain crowns possess. Properly constructed, they are very strong. The freedom from irritation and the translucency of the porcelain make it possible to insert them in such a manner that they will often defy detection even by the most experienced eye, a result which can only be approximated with any form of crown which has gold for a background.

There appear to be about three classes of porcelain crowns in use to-day. First, those which come to us ready made, like the Davis, Logan, Justi, Brewster and others. Second, those in which a long pin facing is used and subsequently backed up with porcelain. Third, those built entirely from porcelain bodies made up in the office by bold and fearless operators.

Defects of Crown Methods.

For a few moments let us consider the defects and shortcomings of some of the present productions. In Fig. 1 I have tried to illustrate one of the most serious defects in all ready-made crowns. It consists in the fact that in all cases where there is a deep festoon of the gum, the

neck, or the gum lap, of the ready-made crown is altogether too short, and we are confronted with the space indicated at point (*a*). While there are many methods in vogue to-day for making a perfect joint between the root and the crown, some of them being reasonably good, the fact still remains that the majority of them require comparatively sound and well shaped roots. This class of crowns is also exceedingly limited in its range of adaptation; little provision is made for meeting the requirements of roots of abnormal size or shape, and an operator has very little latitude in which to produce artistic effects in posing them so that they will reproduce the slight irregularities so common in the natural teeth.

There are comparatively few operators who have had sufficient experience to enable them to successfully produce crowns of the third class for the anterior teeth. It requires too much time and skill to produce the delicate shadings and we shall, therefore, find it greatly to our advantage to employ some form of class two, and use the facings furnished us by the manufacturers in endless varieties of sizes, shapes and colors. We are told that these crowns are weak, that the porcelain which is fused on the backs of the facings chips off and leaves the platinum pins exposed; this leads to the popular fallacy that porcelain can not be fused by the operator as well as by the manufacturer, and this theory is further supported by the fact that the ready made crowns seldom break unless they are materially weakened by grinding in the process of adaptation. To my mind this does not prove anything of the kind. It must be granted that a man who is doing any one thing constantly will probably do it a little better than someone who only does it occasionally; aside from this the manufacturer has no advantage over us. Porcelain will yield satisfactory results to any earnest student. With our present furnaces and pyrometers there is no reason why this material cannot be fused by the operator in his laboratory as well as anywhere else or by anybody else. It is still further claimed that the manufacturers pack their porcelain in molds under heavy pressure and that we cannot do this, therefore we cannot produce the same results. I suspect this is also incorrect, for the porcelain, after having been packed in the molds, is removed and taken to the furnace and there is no pressure of any kind whatsoever upon the porcelain at the time of baking. Porcelain when manipulated in the laboratory should be worked very wet instead of very dry, and while it will probably shrink a little more than when packed under pressure, the finished product will be the same. They both shrink, and in doing so take their natural molecular relation—and that is all there is to it.

I have here two samples of porcelain which were originally fused

as one piece and subsequently cut apart. They contain considerable more porcelain than would ordinarily be used in a single crown; yet an examination will show that they are fused fully as well as the average product of the manufacturer. In grinding through a number of facings, it is surprising to find what a large percentage of them are more or less defective. The porcelain in the samples was simply mixed with water and poured out into my hand and rolled together as the water was drying out. These specimens, like those which I shall subsequently show, were baked by my office assistant and are the first and

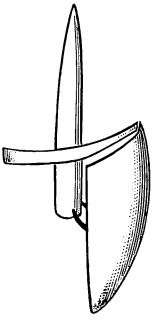


FIG. 2.

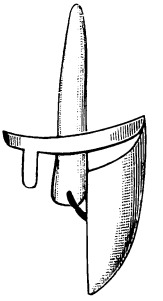


FIG. 3.

only specimens prepared for this meeting. In other words, they were not picked out from a larger number as being the best. They represent the average work which can be done at any time.

Faults of Construction.

Granting that porcelain can be satisfactorily fused in the laboratory, what then is the trouble with this class of crowns? It is not necessary to go far to discover causes which often lead to failure. For the purpose of study I have reproduced (in Figs. 2 and 3), as nearly as possible, illustrations taken from publications from authors of some note. They are expert porcelain workers, but as they are not here to defend themselves, I will not mention names. One represents the construction of a central incisor, the other that of a bicuspid. Remembering that porcelain owes its strength to its bulk, we see at first glance that the metal is far in excess of the demand and that it becomes an element of weakness instead of strength. Another exceedingly important thing to remember is that porcelain cannot be perfectly baked, in large quantities, between two fixed points. In Fig. 2 the pins have been soldered to the post and the facing becomes one fixed point and the post another fixed point. In fusing large quantities, the porcelain

will adhere to the post and shrink away from the facing, or it will adhere partially to both and leave a bad fracture between them. If I were to complete the bicuspid crown, I should want to add substantially all the porcelain in one bake, and it would never fuse in the world without being very defective between the two platinum posts. To illustrate this, I have here a sample (Fig. 4) which is slightly exaggerated, but fully shows what takes place to a greater or less degree every time an attempt is made to fuse a large quantity of porcelain between fixed points. You notice that the porcelain is badly fractured, and if an attempt is made to fill it in at a subsequent bake, it is very questionable how satisfactorily it can be done; the walls of the fracture continue to make two fixed points and must be regarded as an element of weakness.

In order to be strong, a crown must be constructed in such a man-

FIG. 4.

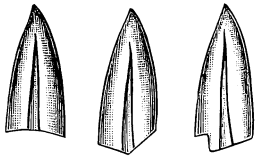


FIG. 5.

ner that there will be no space between the post and the facing (as shown in Fig. 2), for the porcelain in shrinking will be obstructed by the post and stop there, instead of going in a mass and uniting perfectly with the facing. The only exception to this rule that I know of is when Jenkins Prosthetic Porcelain is used. That seems to have a flowing quality and will settle down and fill the intervening space, but this porcelain lacks good carving qualities and is totally devoid of a necessary setting quality which I will hereafter mention, and is therefore eliminated from consideration—as the old darkey said, "We will dispense without it."

We need a crown which can be adapted to roots of any size and shape, whether decayed or not; which can be posed in any position; which possesses strength and beauty; and which can also be constructed in a reasonable length of time, without the use of models. This brings us to the topic of the evening.

Method of Constructing a Tompkins Crown.

In order to present what I desire I will start at the foundation, which, of course, is the preparation of the root. As illustrated in Fig. 5 the individual operator may exercise his own pleasure in regard to the shaping of the root. It may be made concave, with double bevel, or with step. Inasmuch as the double bevel is probably used by the great majority of operators we will accept that as our standard for consideration.

In order to conceal a metallic base the labial face of the root should be ground well underneath the gum. There are a great many root facers on the market to-day, but I have found nothing so convenient

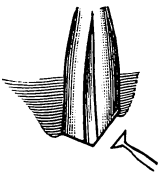


FIG. 6.

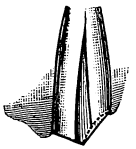


FIG. 7.

as a small mounted carborundum stone, No. 19, made by the White Company. It is small enough to be held firmly, and it cuts rapidly. After the root has been ground to the gum margin, with the ordinary stump stone, it takes only a short time to carry it underneath the margin the desired depth.

At this point I wish to suggest an important change which will be found very convenient when the adjustment of the facing is made. Instead of leaving the face of the root flat as has been the custom for years, I would employ the principle suggested by the "ball and socket joint," and hollow the labial face of the root and give it something of a saucer shape. This can readily be accomplished with the same little carborundum stone. After it has been carried back and forth across the face of the root something on the order of a plane, as already mentioned (Fig. 6), the edge usually becomes dull and somewhat rounded, and by simply tipping the handpiece up and running the edge in contact with the root the effect can be produced which is illustrated (in Fig. 7).

In order to facilitate the making of the cap, I would also suggest another change in the preparation of the root. It consists in cutting a groove or seat which will prevent the metal from turning while it is being conformed to the shape of the root. This is done with an

instrument as illustrated in Fig. 8. It being difficult to describe this formation, I have prepared a large model (Fig. 9), which will show better what I mean.

Posts. Now we will consider the subject of posts. It is a matter of vital importance in connection with bandless crowns. All crowns of the Logan type are subject to the criticism that the posts are the strongest at point *b* (Fig. 1), whereas the strength should be at point *c*. Remembering that porcelain depends upon its bulk for strength, the post should decrease in size as it

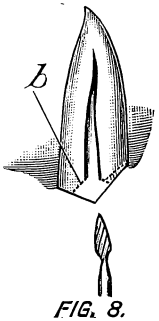


FIG. 8.


FIG. 9.

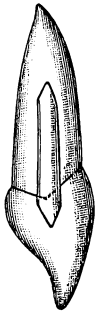


FIG. 10.

protrudes into the crown instead of increasing, and should occupy as little space as is consistent with the requirement of strength. A friend has called my attention to the fact that a post which has the same diameter throughout its entire length is much harder to withdraw than one which is tapered, and it is therefore desirable to adopt this principle as far as possible in making the post. They are made from square, iridio-platinum wire, gauges Nos. 14 and 16 being the ones most frequently used, and Fig. 10 represents about the proportionate size a post should bear to the rest of the tooth.

Cap. To-day there are a great many different methods for making the cap, or, if desired, cap and half-band. With the aid of the little seat I have suggested, the making of the cap is such a simple matter that there is little use for the countless devices now on the market for swaging a metal cap. The post having been prepared, the next step is to take a strip of platinum, about No. 36 gauge, wide enough to cover the root and of sufficient length to be readily held in the thumb and forefinger of the left hand, while, with a suitable instrument, it is burnished or spun into the seat already mentioned. At this time not the slightest attention is paid to conforming the metal to the rest of the root. Now remove the platinum and cut

it to about the length which will be required. Replace it on the root, and while in position, make a small incision through the platinum directly over the post hole; grasp the post firmly in a small pair of forceps, push it through the incision directly to place. If this is carefully done the cap and post can be removed together without waxing, and taken to the furnace and soldered without investment. Twenty-five per cent. platinum solder should be used. After soldering, it is returned to the root, and it is a comparatively easy matter to force the metal to conform closely to the face of the root, either with the use of burnishers or with a small pine stick and mallet. As soon as the outline of the root begins to show the extra platinum is cut off. A small pair of chiropodist's scissors will be found most excellent for this purpose.

If the root has been carefully prepared in the manner described, the gum should be wounded only to a very slight degree, and the fitting of this cap is ordinarily not a painful matter, but if desired, cocain may be used for extremely sensitive patients. It will sometimes be found that the gum is a little inclined to drop down over the root and is not readily forced back. In all such instances a pellet of cotton saturated with adrenalin chlorid may be used to advantage in pushing the gum away, the patient holding it there while other preparations are being made. It will surprise one who has not tried it, to see how far a gum can be pushed back, with the aid of this agent, in five or ten minutes. I might also mention, in passing, that the adrenalin chlorid may be used to paint the gum, with very gratifying results, in all cases of peridental inflammation which we have become accustomed to treating with belladonna and iodine.

The Facing.

To return to our topic, we will now consider the adjustment of the facing. It is always a great advantage to make selections from the product of manufacturers who use extremely high-fusing porcelain—as they will not change color in subsequent baking. It is also important to have those which are exactly the right size. The facings are all carved by artists and extensive grinding destroys their proportions and materially lessens the artistic effect of the finished crowns. Therefore, at the preliminary examination and before the remnants of the natural crown have been cut off, it is a wise precaution to be sure that we have a suitable facing for the case in hand. A small pair of draftsman's dividers—about three inches long—will be found a convenient instrument with which to actually measure the length and breadth of a facing and the space it is to occupy.

Having made the selection, grasp the facing by one of the pins with a strong pair of pliers, carry the facing to position on the root,

and do whatever grinding may be necessary to adapt the facing to the root. The advantage of the "ball and socket" preparation of the root will now become evident, as the facing can be turned in any position desired without opening the joint. After the facing has been ground so as to occupy the proper position as related to the other teeth, cut the platinum pins off and grind them out a little below the surface of the porcelain and also remove the glaze from the back of the facing. Now place the cap and post on the root and carry the facing to place, holding it in actual contact with the cap and post with the index finger of

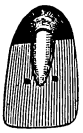


FIG. 11.

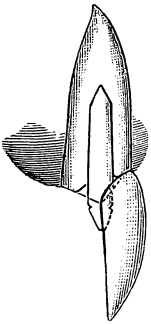


FIG. 12.

FIG. 13.

the left hand. The occlusion is now noted. In a vast majority of cases it will be found that the facing will stand out too far in the mouth and a groove must be cut in the back of the facing (Fig. 11) in order to accommodate the post (Fig. 12). On the contrary, if it is found that the facing does not stand out far enough when held in contact with the post, the first thing to do is to bake a fresh quantity of porcelain on the back of the facing (Fig. 13), after which the facing is again brought to the mouth and the new porcelain is ground until the facing will occupy its proper position when held in contact with the post. This work should be done carefully so that in the next step the facing will have a definite seat to go to.

We are now ready to fasten the facing to the post. This is accomplished by taking advantage of a certain "setting quality" which is found in medium fusing porcelain. It is an inherent quality of this preparation, and is due to the kind of clay used in its manufacture and the method of incorporating the flux. There is no admixture of any substance like starch or gum tragacanth. It is a very workable material,

and will withstand considerable handling and permits extensive carving, which other grades of porcelain will not allow. It also can be readily ground and polished after it has been glazed. It seems to me that the profession has overlooked many desirable features in this production, and is making the manipulation of porcelain a task rather than a pleasure.

At this point the labial face of the cap is varnished with a thin solution of shellac so that when the fresh porcelain is added it will not adhere to the platinum in fusing, but will unite with the facing and the very slight crevice which is left can be filled in at the next baking.

FIG. 14.

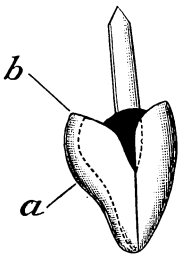


FIG. 15.

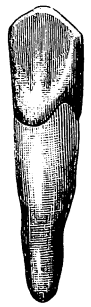


FIG. 16.

Uniting Facing to Post with Porcelain.

Now, the trick consists in uniting the facing with the post, and making the adjustment in the mouth. It is done by placing a small quantity of freshly mixed porcelain on the back of the facing. carrying the facing to place on the cap and post, and simply holding it there with the left hand for a short time until the porcelain dries out and "sets." This setting can be greatly hastened by adding a little dry porcelain. A Reeves carver is a convenient instrument with which to do it. Moisten the tip of the carver, dip it in the dry porcelain and with it dry out the moisture in the porcelain on the back of the facing. This whole operation takes less than two minutes, and it will surprise one to see how firmly the facing will be held on the post. It can be readily handled and the excess of porcelain can be brushed from the cap. Only enough porcelain should be used to engage the sides of the post and be flush with its palatal surface, and none should be allowed to extend over the palatal face of the cap. This is then carried to the furnace and baked (Fig. 14).

At the next baking, it is expected that substantially all the porcelain needed to complete the crown will be added. In connection with this there are two important things to remember: first, shellac the metallic base, so that in the process of fusing the porcelain will not adhere to and drag on the platinum, but will unite with the facing in one homogeneous mass; second, in adding the fresh porcelain, always make a wet union—the wetter the better. One is materially aided in this work by holding a small strip of newspaper around the crown. A convenient quantity of porcelain, mixed to the consistency of thick cream,

FIG. 17.

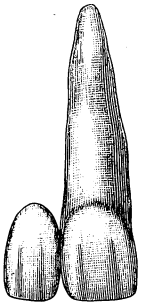


FIG. 18.

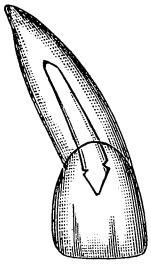


FIG. 19.

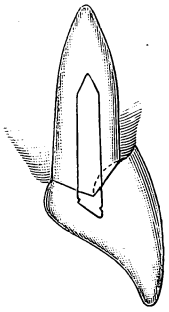


FIG. 20.

is now poured in. When it becomes a little unmanageable, add dry porcelain to stiffen it. Continue to add wet porcelain and dry it out until a sufficient quantity has been placed in position. When in a semi-plastic state, remove the paper and with the fingers the porcelain can be readily patted into any desired shape, remembering that the bulk must be much in excess of what is desired in the finished product (see Fig. 15-*a*). If it is subsequently found that at any point there is not sufficient porcelain, moisten that particular spot by carrying a small quantity of water to it with a camel's hair brush and quickly add fresh porcelain. This will make a wet union and the slight additional moisture will be quickly absorbed by the bulk of porcelain without its shape breaking down. The working quality of this particular porcelain is remarkable, and in a short time one will develop considerable skill in its manipulation. The crown is now put in the furnace and brought to a good biscuit bake. At this time the excess of porcelain, if any, is ground off, and the crown given the exact shape which is desired, the occlusion, of course, being one of the principal features to consider.

When the porcelain was being built up no particular effort was

made to produce a smooth surface, as it is found much more advantageous to wait until it is biscuited and produce that effect by going over the work with a sand-paper disk. If, in building up the porcelain, it is carried well out (as shown at point *b,* Fig. 15), it is often unnecessary to add any more porcelain. However, if it should shrink away a little at that point, this space should now be filled in and the work given its final glaze. Work finished in this manner will have a beautiful surface, and one can scarcely tell where the new porcelain begins and the old leaves off. Crowns for bicuspids can be constructed in exactly the same manner, it being necessary only to make a few changes in matters of detail. When the particular tooth to be crowned has one root, enlarge the canal in such a manner that the post can be diverted from the center and thrown into the buccal cusp, or bend the post at neck, accomplishing the same purpose. In the event of the tooth having two roots make a single post crown, placing the post in the buccal root, provided it is large enough to accommodate a strong post; ignore the other root so far as the construction of the crown is concerned. If the roots are small and it is deemed wise to use two posts, make a good groove or seat between the post holes. In making the metallic base, force it into this groove and then fill it with platinum solder, thus firmly uniting the two posts. Cut off the palatal post flush with the cap, allowing only one post for the attachment of the porcelain, and that in the buccal cusp, because it is the largest. In building up the crown simply be sure to get on enough porcelain to fill the approximal spaces and secure occlusion. After it has been biscuited, grind to proper approximal contact and occlusion.

The possibilities of this crown are almost limitless. Fig. 16 is a finished crown. Fig. 17 is simply a novelty; the crown carries gum enamel and shows to what extent restoration can be readily made.

Fig. 18 is a reproduction of a case in practice. It is constructed in the same manner. Both facings were adjusted in the mouth at the same time and fused without investment of any kind.

Figs. 19 and 20 are intended to illustrate the correction of irregularities in patients of mature years; the facing in No. 20 having been carried considerably in advance of the root outline, and shaped at the neck to conform to the contour of the gum.

Needed Changes in Tooth Forms.

To the Editor of ITEMS OF INTEREST.

Sir—The meager response to my appeal in the November issue of ITEMS OF INTEREST for support and assistance in the effort to secure more scientific forms for artificial teeth, and a more scientific and systematic arrangement of teeth into typal-form groups, has been interpreted by some of my friends in America as indicating great indifference, on the part of the profession at large, to all of the questions raised. And you, Mr. Editor, in your editorial in the January issue, tacitly implied the same opinion. With this opinion I do not altogether agree. Many are really indifferent, no doubt, and others are apparently indifferent, but nothing that I have seen or heard will shake my belief that, if the whole proposition can be got adequately before the profession, it will arouse quite sufficient interest and enthusiasm to carry it to a completely successful issue. The advantages are too great for the result to be otherwise.

If I could give, in the pages of this journal, an adequate representation of what I have in my mind, it would not be necessary for me to do anything more. It is because I see so clearly that there is not one single logical defense for the present position that my belief is so strong that it can not much longer endure.

But to get an adequate presentation of the subject would mean an enormous amount of work if done by one man alone, but if the imagination of a sufficient number can be touched the work will be comparatively easy.

And just there lies the difficulty. Very few realize that imagination is the chief factor in all scientific as in all other creative work. Any dentist who has the power to picture in his mind the greatly increased beauty and usefulness of artificial teeth carefully modeled after nature, and the great saving to himself in time which would accrue from a scientific and systematic arrangement of a catalogue or specimen card showing such teeth, will inevitably vote for the reform.

Some of my confreres seem disposed to lay the blame for the present defects in artificial teeth entirely at the doors of the manufacturers. With that proposition, also, I do not entirely agree. The manufacturer makes no pretense of being governed by the ethical rules which are supposed to influence the members of a learned profession, but I have no hesitation in saying that far greater benefits to our profession have

resulted from the enterprise of manufacturers than have ever grown out of any *collective* or *co-operative* action of the profession itself. And that must stand as an everlasting reproach.

If one hundred prominent dentists were to sign a request for any definite thing wanted it is altogether probable that any of the leading manufacturers would spend any reasonable sum of money and make any reasonable effort to supply that demand. Now, it should not be a difficult thing to get one hundred times one hundred dentists to sign a petition for improvements in artificial teeth. If such a thing were to be done then any manufacturer would feel justified in making the necessary expense at once.

Is there a dentist in the world who believes that further improvements in artificial teeth are impossible? If so, let him speak up, but if he believes that further improvements *are possible,* then let him also speak up and *say that.* Nothing more is necessary. That is all that the manufacturer is waiting for, and there are those ready to do the work which will result in the improvements.

There are those who seem to think that a great amount of discussion is necessary, an extensive comparison of notes and requests for opinions before anything can be done. I will try to make clear that this is a mistake. All are agreed, I think, that we must go to nature for the desired improvements. That is just what we are asking for—artificial teeth which are modeled after natural teeth. Now, I will make an assertion in the form of a challenge. I challenge any one to find a set of teeth, natural or artificial, which cannot be placed in one of eight or ten groups (probably the number of groups would not exceed seven), and present any differences or peculiarities which are not entirely negligible. If all the teeth made by all the manufacturers in the world could be got together it would be found that they could be easily arranged in these groups.

Where, then, is the defense for the present system? There is no defense. And there is no system in the proper sense of the word. There is a heterogeneous arrangement which, like a thousand other stupid or irrational things, exists because it happened.

Do you not see, then, that the only thing necessary is to secure the best natural specimens of typal forms and follow these as closely as possible. Suppose a start were made with six or seven of these typal forms, with about the same number of sizes for each form, and after a time there should appear a consensus of opinion that another specific form were necessary, then that would simply be added to the system.

All human teeth are built up on a few simple geometrical forms, and all who have studied the subject are in substantial agreement as to what the typal forms are. Even the manufacturer has followed these typal forms in a conventional manner so closely that all of their products can be easily arranged in a few groups as I have just said. What we want is to eliminate these conventional defects, imitate nature more closely, and do away with the great number of unnecessary molds, so that we may work quickly, surely or scientifically in making our selection of teeth. The main part of the work of this proposed reform consists in the examination and comparison of a large number of models and skulls for the intermediate or doubtful types. There would be no disagreement or discussion over four or five of the most distinct types of teeth, and the making of models from these might be proceeded with at once.

Then comparison and discussion of the intermediate types could be arranged for the important conventions and the matter would soon be completely settled. And here is a very important point for the manufacturer—*once these typal molds or models were fixed all expenses for the making of parent molds or models would cease.* As the business is conducted at present every enterprising manufacturer feels that he must occasionally bring out a new model of tooth. Why not do away with all of this expense by covering the ground completely in a scientific manner? Since my first letter appeared in the November issue of this magazine I have been asked by several manufacturers to carve up a set of "biscuited" teeth according to my ideas.

Let me repeat here what I have said to each of them—that I have not the least interest in anything of that sort. I not only have no desire to add one more to the molds in existence, but, on the contrary, I wish to do away with the hundreds of unnecessary molds and have a scientific system of a few models which will cover all the ground far better than it is covered now. The idea that a large number of molds is necessary seems so fixed in the mind of the manufacturer that it is difficult for him to grasp the true situation.

The undoubted reason for the failure of those who have attempted to put a few molds of so-called "natural teeth" on the market is that, not being arranged in a harmonious system, the contrast between the "natural" teeth and those which dentists have been in the habit of looking at came as something of a shock. So easily does the mind fall into a habit and follow the lines of least resistance.

But even these so-called "natural" pattern teeth are not very near my idea of what we want. I examined several of the numbers of the

Twentieth Century teeth mentioned by Dr. Haskell in his letter published in the February issue of this magazine, and while I am ready to admit that they represent a step forward, yet the occlusal surfaces are far from perfect. The finest bicuspids and molars that I have yet seen have just been brought out by Messrs. C. Ash & Sons. The slopes of the buccal surfaces of the molars represent the first attempt that I have seen to overcome the difficulty caused by the absorption of the upper and lower alveolar borders. But these sporadic efforts count for but very little. The complete system is what we want and what the entire profession will indorse when it is given to us.

Prof. Edward Alsworth Ross, in his recent book on industrial ethics, says:

"The pace in any given profession is often set by the meanest man who is allowed to continue in the business."

That exactly describes the position in dentistry to-day so far as the making of artificial teeth is concerned. I have recently been told, by one who undoubtedly knows, that the unqualified men who are practising dentistry in Great Britain use nine millions of teeth for every one million used by the qualified dentists. And those who use the nine millions are satisfied with what is produced. They set the pace. They call the tune, and we have to dance to their music. Much the same condition prevails in America.

Brother dentists, if you are neither satisfied with nor indifferent to this state of things, the remedy is in your own hands. And you have so little to do to bring about this reform. If there are in the whole world five thousand dentists who are in favor of a more scientific system of making and arranging artificial teeth, they have only to write a few earnest words expressing their views and forward the letters to me or to Dr. Ottolengui, and this much-needed reform will be effected, and that right speedily, to the credit and honor of our profession.

The president of one of our largest dental manufacturing companies has recently said in an advertisement:

"*First*—Learn to know what you want.

"*Second*—Insist on getting it.

"*Third*—The dealer will then be sure to keep it."

Better advice has never been given us. I commend it to your most thoughtful consideration.

J. Leon Williams, D.D.S., L.D.S.

30 George Street, Hanover Square, London, W.

Editor ITEMS OF INTEREST.

Dear Sir—The Odontological Society of France in its session of November 26, 1907, has endorsed the claims made by the eminent anatomist, Dr. Leon Williams, of London, in regard to modifications in the shapes of porcelain teeth and encourages you to urge manufacturers in this direction until you get complete satisfaction, which we are all so anxiously awaiting in France.

Yours, etc.,

DR. OSCAR AMOEDO.

Rue Serpente 28, Paris, France.

Editor ITEMS OF INTEREST.

Dear Sir—I noticed an article in the ITEMS OF INTEREST some time ago with reference to the unscientific way in which the present molds of teeth are made. I heartily agree with the author of the article. I have tried from time to time nearly every make of tooth, hoping to find what I wanted, but with the same result, that they are all about alike. Had they tried to get as far away from nature as possible, but still retain a semblance of it, they could not have better succeeded.

As a rule the molars are too small and too poorly shaped. In case they are not too small they are poorly shaped, and the proportion between the upper and lower in both cases is not correct. The lack of proportion and poor shape is not alone confined to the molar teeth, but applies to the incisors and bicuspids as well.

If at any time you should learn of a scientifically made tooth being put on the market, if you will let me know I shall be greatly obliged. I remain

Yours truly,

F. B. BOSTWICK.

Gibraltar, Spain.

Editor ITEMS OF INTEREST.

Dear Sir—For many years I have called the attention of teeth manufacturers, and also of the profession, both orally and through the dental journals, to the serious defects in the shape of the bicuspids and molars,

and they pertain to all makes, to a greater or less extent. But it did not have any material results, for other dentists did not respond except as I talked with them personally, when they always said I was correct. However, as I seemed to be the only "kicker," the manufacturers did not deem it necessary to take notice of it, as their teeth were sold as fast as they were made.

Now I am glad to see that one editor of a dental journal, and that a trade journal, too, of wide influence, has taken up the cudgel and in earnest.

As soon as I read Leon Williams's paper I at once wrote to him, and presume I am the one he refers to from America. Shortly before that the editor of this journal wrote, asking my views, to which I at once responded.

What is the trouble with these teeth, as is so universally the case? In nature the lingual cusps of the upper teeth are shorter than the buccal, and the lingual cusps of the lower longer. In artificial teeth the cusps of the upper are generally of the same length. Now, it is an impossibility to arrange the buccal cusps in proper alignment with the anterior teeth without grinding the lingual cusp. Then what do we meet? The pins are so near the cusp it must be all, or nearly all, ground away and the tooth ruined.

What is the remedy? Simply set the pins lower, for in the average tooth there is a long shank which is unnecessary, and which can be occupied by more porcelain over the pins, giving a more shapely crown.

Another serious fault is found in the lack of masticating surface. There are so many thin, narrow, good for nothing, so-called teeth, yet used by many dentists.

Twenty-five years ago I appealed to the largest manufacturer personally. The result was four new molds, but I never found them in sets. Later on I appealed to the next largest firm and the result was a change as above indicated, but the bicuspids were made so narrow I could not use them.

Dr. Williams calls attention to the unnecessary multiplication of molds, and this is very true. The stock of molds could readily be reduced at least one-third, if not one-half. Many molds are almost duplicates. Then cut out the molds of deciduous teeth, for the putting of such teeth into the mouth of an adult is simply ridiculous.

There are molds of horse teeth; what they were made for it is difficult to conceive.

Then the "short-bite" teeth, except in case of very short teeth, I never have found any place for. Upon inquiry I find that many are sold, and upon investigation ascertained why they were used. In cases where

the rubber gum showed, instead of extending the rubber outside of the gum, the long shank of the teeth were laid outside the gum, high as possible, leaving about three-sixteenths of an inch of tooth below the gum margin; consequently the jaws almost close together and the mouth in collapse. The proper thing in such cases would be to set the necks of the teeth against the gums, if the patient could not afford the continuous gum dentures, the only proper thing in such case.

Very truly yours,

L. P. HASKELL.

Chicago, Ill.

Editor ITEMS OF INTEREST.

Dear Sir—Read your editorial in the January ITEMS with a great deal of interest; simply want to add my protest and say teeth are *not* made as they should be. In the first place, the manufacturers have entirely too many molds—eight or ten would be enough if they were the right shape. Have not time for a long criticism.

Truly yours,

G. W. WHITSETT.

Greensboro, N. C.

Editor ITEMS OF INTEREST.

Dear Sir—I believe Dr. Williams is correct, anatomically, in the question of artificial teeth and I think he should be encouraged; also the manufacturer should be patronized who takes up the matter. My trouble is with bicuspids.

Truly yours,

DR. DALBEY.

DuQuoin, Ill.

Editor ITEMS OF INTEREST.

Dear Sir—Thank you for your editorial in the ITEMS OF INTEREST recalling what I intended to do at once on reading Dr. Williams's article. I certainly hope steps will be taken to do as he suggests, and will do all

in my power to make such an enterprise a success, provided, of course, the teeth are right in other ways, shades, texture, etc. I was driven from the use of S. S. White teeth, which probably have the best selection of molds, because the shades were so poor and seemed to be growing worse.

Hoping for this much needed improvement, I am,

Yours respectfully,

ARTHUR L. MILES.

Cambridge, Mass.

Editor ITEMS OF INTEREST.

Dear Sir—I have been reading the ITEMS OF INTEREST on the porcelain tooth question and would say that most teeth are too small across the morsal surfaces of molars and bicuspids. If they were a third larger across and not very long they could be set up with a great deal less grinding—better articulation and more surface to masticate.

Very respectfully,

C. W. HARTER, D.D.S.

Perry, Iowa.

Editor ITEMS OF INTEREST.

Dear Sir—In reference to your article in the January issue on "Improved Forms of Artificial Teeth," I wish to lend whatever strength I have toward furthering this much needed reform. In grinding and setting up a full upper and lower on an anatomical articulator, and in gaining a satisfactory three-point contact, it sometimes takes me just about two days' time, using teeth as now supplied to us.

I do believe that the manufacturers of our artificial teeth can bestow a lasting benefit upon the dental profession by making the cusps of all bicuspids and molars to more nearly conform to the general size and shape of the normal natural teeth as seen in mouths of middle-aged people.

Nature is hard to improve upon. Perhaps she is too prolific in supplying models of too widely different types; this I hardly believe though.

The cusps of the entire grinding surfaces could of a certainty be more defined and a deeper sulcus cut mesio-distally.

I believe that a ready response will be forthcoming from the many dentists who care, and I believe that all classes of the profession will be forced to realize the benefits to be derived from use of teeth of better size, shape and more naturally arranged cusps.

And lastly, I believe, too, that the manufacturer will be amply repaid in thus catering to our needs in this line.

Sincerely and fraternally yours,

T. J. McCracken, D.D.S.

Portland, Ore.

Editor Items of Interest.

Dear Sir—Was much surprised when I read your editorial concerning the proposed change in tooth forms or molds as suggested by Dr. Leon Williams in the November issued of the Items of Interest.

As one of the thirty thousand, I would like to take this occasion to protest against the existing conditions, and I earnestly hope to see the time when the manufacturer will produce forms of teeth after the Bonwill patterns.

Very truly yours,

W. J. Wisecarver.

McMinnville, Ore.

Editor Items of Interest.

Dear Sir—Complying with your January editorial, permit me to show some appreciation of Dr. Williams and your own efforts by stating that in my opinion artificial teeth should have larger morsal surfaces, and molds should be in accordance with the Bonwill well-known occlusion.

Yours very truly,

W. L. Whipple.

St. Louis, Mo.

Editor ITEMS OF INTEREST.

Dear Sir—I have read with much interest the letters of various dentists in regard to new models of teeth. While it is true the teeth on the market at the present time are far from perfection in many ways, who is there in our ranks who knows just what is needed and wanted? There is *something* wrong, but just what it is none of us seems to know —if so—it seems to me the problem is solved.

The greatest trouble I find with the present molds is shallowness of cusps and narrowness bucco-lingually. It is very evident that we all do not find the same trouble, and when we come to a common conclusion, I think we will find the fault our own, and not the manufacturers'. They will, I am sure, be only too glad to manufacture what the profession demands. *We* are the ones supposed to know what is needed, and not the manufacturers.

Wishing the movement speedy success.

Yours very truly,

JAS. W. POWER, D.D.S.

Wilmington, N. C.

Cements—Their Use In Orthodontia.*

By Dr. W. V.-B. Ames, Chicago, Ill.

Read before the American Society of Orthodontists.

In accepting your invitation to present the cement subject from the orthodontists' standpoint, I did so without a belief that I could furnish any information specifically beneficial in your application of oxyphosphate cements, and I find at present that I can only treat the subject as it would be of interest to the practitioner in general, except in so far as we need to take cognizance of the fact that your work with cements is almost entirely confined to the setting of bands fitted upon and around the sound teeth, in which condition an amount of expansion is permissible which would be objectionable in the setting of crowns or inlays. For this reason there will be an attempt to make plain the factors accounting for shrinkage and expansion in oxyphosphates. In addition to doing this we must necessarily consider the conditions giving those necessary qualities, adhesiveness and prompt setting in the presence of moisture, without accompanying shrinkage.

Shrinkage and Expansion.

Shrinkage or expansion may occur in oxyphosphates of zinc which crystallize or set to an impervious mass, and does not occur, or rather is never evident, in those in which the setting results in a porous mass. Of the latter class more will be said later.

* This paper and discussion will be found as interesting and useful to inlay workers as to orthodontists.—Editor.

Shrinkage in an oxyphosphate of zinc is the result of water being given off in the setting process, because the formula has contained water in excess of the amount necessary for proper crystallization, so that the mass, not taking on porosity, it must take on reduced peripheral measurements.

Expansion in an oxyphosphate of zinc is the result of water being taken up in the setting process, because the formula has not contained sufficient water to furnish the water of crystallization for proper setting. when, if water be accessible, it will be taken into the mass with the result of increased peripheral measurements. The setting of an oxyphosphate of zinc in the presence of aqueous moisture, with the taking up of a slight quantity of water, as water of crystallization, instead of giving up some of its acid to the surrounding aqueous moisture, depends upon the modification of the acid by proper phosphates.

"Hydraulic" Cement Defined.

The term "hydraulic," as ordinarily applied to cements, implies that the ingredients of a certain cement will harden even in the presence of a large excess of water. Since the ordinary industrial hydraulic cement depends upon the admixture of water only for action in hardening, the term as applied to a dental oxyphosphate of zinc is apt to be misleading. An absolute, accurately balanced formula would set with neither shrinkage nor expansion and without taking up water of crystallization or without giving off any water. It happens, however, that with some desirable formulæ, this exact balance gives too quick setting, and that a desirable setting quality may be secured by depriving the formula of a slight proportion of water, depending upon the ability of the hardening mass to take up water in the proper quantity for its water of crystallization, without having the balance disturbed at the surface in so doing. It can be reasonably supposed that there is an adjustment of the residual water within, to accommodate the taking up of some at the surface exposed. It will be seen that an oxyphosphate of zinc needing some additional water for proper crystallization need not necessarily be applied to a visibly moist surface, but that if the slight quantity of water needed were present, it would be taken care of. Since, however, the giving in this way of just the proportion of water needed would be a risky undertaking, and since water given at the ultimate exposed surface or surfaces answers the requirements, it is more advisable to have the tooth only normally moist, *i. e., not desiccated,* and to depend upon the taking up of water from without for proper crystallization.

This hydraulic property can be embodied only in such formulæ as tend to give rather quick setting, as otherwise there will be a drawing

away of the acid upon subjection to moisture, thereby disturbing the proportions of the formula, with the result of a weakened and porous mass to the depth of the disturbance. A formula can contain residual water to the extent of giving off some in the crystallizing process which will result always in a shrinkage, whereas one being short of water of crystallization will take up the proper quota, if available, with a resulting expansion.

Some cements, conspicuously oxyphosphate of copper, which can not be depended upon to behave properly in the presence of moisture, can be caused to harden so promptly by slight elevation of temperature that they are practically hydraulic, for the reason that they so quickly pass the stage of setting in which they are damaged by moisture.

Adhesion of Cement.

Adhesion of oxyphosphates to surfaces of enamel, dentin, cementum or metal, depends upon the density and strength of the granulated surface of the cement; upon the form of granule agglomerated to compose the surface; the condition of the surfaces presented for cementation, and absence of shrinkage. In other words, the strength of adhesion will be in proportion to the strength of favorably shaped granules composing the cement surface, and the irregularity or porosity presented upon the surfaces to be cemented, this being in contradistinction to the adhesion of a gum mastic to a smoother surface. As the cements used are essentially oxyphosphates of zinc, we will treat them as if they were that, pure and simple, and speak of the powder as oxid of zinc. The strength and density of a cement will depend then upon the powder being a zinc oxid sufficiently basic to give dense vitreous granules, which, when agglomerated by proper basic phosphates, will furnish a mass of greatest strength, and if these dense granules happen to have forms best calculated to knit into the minutest inequalities of the surfaces presented for cementation, then the maximum adhesion is obtained. In connection with form of granule, it can be said that ordinary zinc oxid as obtained by sublimation of metallic zinc, *i. e.*, so-called zinc white or flowers of zinc, is an amorphous substance. The oxid obtained by precipitation of a zinc salt by an alkaline medium is practically the same, and while the specific gravity of these may be changed by calcination, a true crystal is not obtained, and upon reduction to a fine powder there is a return to an amorphous condition. Oxid of zinc in the basic state as obtained by ignition of a salt of zinc, may be granular or crystalline, according to conditions, and if properly crystalline, will help constitute a cement giving the maximum of adhesion, for the reason that needle-like extensions of crystals really knit into the minute inequalities or pores of the surface presented for cementation.

We have spoken of the agglomeration of the granules and crystals by a basic phosphate. To help our understanding, we will define an oxyphosphate of zinc as a mass in which zinc oxid granules are held together or agglomerated by basic phosphate of zine. This basic phosphate of zinc is formed after presenting an excess of basic zinc oxid to phosphoric acid or an acid solution of the phosphate of one or more of the metals. I mention this because the nature of the resulting agglomerating basic phosphate depends markedly on the particular metallic phosphate used in the modification of the phosphoric acid. The phosphates of the alkaline metals, for instance, used as modifiers, will give porous friable agglomeration media, while the phosphates of some of the non-alkaline metals and rare earths will give dense, glassy, vitreous, agglomerating media, all of which points bear upon the fact that there is a large possible range of quality in these materials, and that oxyphosphates are not necessarily very similar, and as some suppose, merely solution of glacial phosphoric acid for the liquid and zinc oxid for the powder.

Methods of Mixing Cement.

The mixing of an oxyphosphate of zinc for the setting of appliances upon teeth for your purposes, is an art not acquired without some careful attention to details. To have a desirable plasticity at a proper consistency and satisfactory setting, requires a definite procedure, along with a consideration of thermal and hygrometric conditions of the atmosphere and the temperature of the slab upon which the mix is made. I wish at least to call attention to the fact that with a given combination of acid solution and powder, and given humidity, and temperature of air and slab, there is the possibility of a very quick setting with granulation, or a mass which will never set, after having made a mix of a given consistency, all this depending on the too rapid or too gradual addition of powder, or too little or too much spatulation.

Discussion.

Dr. Kemple.

I hardly know what to say in opening this discussion, because to go into the discussion of cements from the standpoint of the chemist would be entirely out of the question with me. We only know what we want, and what properties we require in a cement, and we leave that to Dr. Ames and some of his co-workers to produce. Whether the cement shall have an excess of water, or be a finely balanced cement, or have a deficiency of water, we must leave to Dr. Ames. I believe, however, in the cements

I have had experience with, that the manipulation has more to do with producing just the qualities needed than has the exact chemical composition of those cements.

Dr. Ward. I came over here with the somewhat selfish motive to pick up something rather than to give something; but it affords me pleasure to say a few things on the subject which Dr. Ames has so generously given to the profession as soon as he has worked it out.

There are one or two things which, while they may not appear just the kind of discussion he would like, I would like to thrash out with him. I appreciate quite fully that the demands made upon a manufacturer to-day are about as varied as are the individuals: that one asks for a rapid cement; one asks for the opposite; one asks for an hydraulic cement, while others care little about it; and so on through all the qualities desirable in such a filling material.

Adhesion. However, I cannot understand how anyone who has met these demands as successfully as Dr. Ames has can fail to appreciate that with the advent of the porcelain and gold inlays, and orthodontia, adhesiveness is the quality of most importance, and that if the maximum adhesiveness is obtained between any two substances the surfaces of the substances must be prepared for the purpose. I do not believe the maximum adhesiveness has been developed in the cements we are supplied with now. But, granting that it has, can we expect a surface that has not been prepared to receive this complex substance that he has told you is affected by the humidity of the air, the temperature, the roughness of the slab, the mixing, etc., to permit of much adhesion?

He has made the statement several times that desiccation was not necessary, and as a result there is a general misunderstanding in this vicinity. He has made the statement that substances which take up air, or cause a rapid evaporation of moisture on the surface of a cavity, should not be used, because the cement would take care of it through its hydraulic property. I have tried both in my practice and with my dynamometer to verify these statements, and have, without exception, found that greater adhesion is obtained by first cleaning the surface with something that would remove grease—sodium carbonate or chloroform being quite effective—and afterward wiping the surface with alcohol. If the temperature of the room is comparatively low, a few blasts of warm air will aid materially in preparing the surface upon which the cement is applied.

I have not been able to get as great adhesiveness from rapid-setting

cements as from some of the slower ones, but in no case have I found that great adhesiveness could be obtained without about as much care in preparing the surface as he says is necessary in mixing the cement. None can doubt the effect of moisture upon cements made up from some one of the phosphoric acids after once working with them under the proper conditions to determine it, neither do I think one can doubt the effect of moisture and foreign materials in other forms upon the adhering of an oxyphosphate to tooth structure.

Dr. Ames. I made the statement that I did not feel like going into the manipulation of cements to any extent, for I did not feel like assuming that this was called for, and yet it might have been advantageous to discuss it to a greater extent. When I start on that I do not know where to stop.

Dr. Kemple says the question of how much water the manufacturer should have in the cement formula, whether enough to cause expansion, or have an absolute balance, or so much that some of it would be given up and thus give you a shrinkage, etc., does not concern you. But it should concern you to the extent of making tests by which you can see whether a cement worked according to the instructions of the manufacturer will give you a shrinkage, an expansion, or a zero result, or whether by certain methods of procedure which may be advocated as giving you different results, you might get the difference between a shrinkage and zero, or possibly an expansion.

Dr. Kemple. I am afraid you misunderstood me. I did not mean to say it did not concern the orthodontist in using the cement. I said the orthodontist could only say what properties are most desirable in a cement, and then leave it to the manufacturer to produce. Whether those properties would be given by an excess of water, or by an evenly balanced cement, we leave to the manufacturers.

Dr. Ames. There is such a wide possible range of formula that to satisfy yourself you should make tests of a cement to see whether you get the results desired, and whether (as I call particular attention to in instructions as to manipulation of cements) by rapidly adding the powder, with little spatulation, you get quick setting, and possibly a shrinkage; or by more gradual additions of the powder and more spatulation you get proper working qualities, and probably a slight expansion. By making a large number of small additions of the powder to the liquid, with a great deal of spatulation, you probably get a mass which will never properly set, and which gives a decided expansion.

Dr. Ottolengui. I think I would like to say something that would make more definite Dr. Kemple's thought. You have given the dentist a special cement for temporary teeth—oxyphosphate of copper, and the prosthetic man a special crown and bridge cement, and the inlay man a technic cement for his models. Now, we did not invite you here to tell us how to make them, but to try to induce you to give us an orthodontia cement. What are the qualities we require in such a cement? We need it solely for two purposes; to hold bands on teeth, and to protect those teeth while it is holding those bands in place. Those are the two specific characteristics we want. Also, while a piece of bridge work might need to have two abutments affixed with cement, we very often have, in orthodontic procedure, four bands connected together, and we find it difficult to keep all four of those teeth dry. Therefore, if we can have a little moisture, all the better. If Dr. Ames could put on the market a cement having those characteristics, we would be very glad we had invited him here.

Dr. Ames. I did not feel called upon to come to you, advocating the use of certain cements for the setting of regulating bands, but since I am asked to be more explicit, I will say that with cements of a class, of which Ames's crown and bridge, or inlay for instance, would be examples, taken in colors not too light, to avoid quick setting, if you will make a mix by adding to the portion of liquid a quantity of powder in ten or twelve portions, instead of three or four, the first small additions of powder being quickly and thoroughly distributed to prevent a clotty condition developing, a satisfactory plasticity and adhesion, with a zero state or a very slight expansion and satisfactory setting, should be the result. I do not think it necessary to work out any greater adhesion than may be obtained with the materials we have, when properly handled, recognizing the advantage of using heavily pigmented powder.

I take no notice of an absolute adhesive quality, such as would be attributed to a mastic; but with my inlay cement there is that difference between its powder and that of the crown and bridge cement, that the particles are reduced from a feathery crystal to a finer state, giving you, under the microscope, small, needle-like particles, rather than round-pebbly-shaped pieces, giving a more intimate knitting to the inequalities or pores of the surface. At present I do not know how to increase adhesiveness except from the proper working of what we have.

Dr. Ward. That is what I have reference to. In all processes of crystallization, from the formation of rocks to anything else you may speak of, the slower the process the more complete it will be. When done rapidly it will not

be a well arranged one. Cements are too rapid for inlay work where great adhesiveness is desired. Suppose there is some mechanical retention by the feathery crystals running into the tubuli, would it not be more complete if the cement set a little slower?

Dr. Ames. I (with others) cannot get much light on the philosophy of crystallization. A rapid setting cement is more apt to be a shrinking cement. If you can make it have a slight expansion by the method of working it, it will give you greater adhesion than a cement which has a shrinkage.

Dr. Hawley. What is the effect of a flux?

Dr. Ames. You would use up more water of crystallization and get more expansion.

Dr. Hawley. Would you advise the use of a flux to slow setting of the cement when used under clamp bands?

Dr. Ames. Use a slow setting formula or flux. In the extra spatulation you are dissolving the zinc oxid in the phosphoric acid, forming zinc phosphate which acts as a flux, increasing the tendency to take up water of crystallization, and tending to give expansion.

Oxyphosphate of copper was spoken of. It should uniformly set without shrinkage or expansion, and yet has great adhesive qualities. That probably comes from the peculiar basic phosphate of copper formed, giving greater adhesion.

Dr. Ottolengui. Could it be used for band cementation?

Dr. Ames. It would hold a band as nothing else would. With the application of a little heat you can set it so promptly that in a few minutes you may use all the force you would ever want to employ.

I would caution you that I have known of cases where little caps were placed on the cuspid teeth, with the oxyphosphate of copper, showing but a bit of the point, and the teeth drawn down. When caps were taken off there was a little greenish stain there, because of the imperfect enamel, but I believe it can usually be removed. Cyanid of pottasium is a natural solvent, and by applying the rubber dam as a protection against this poison, you could get rid of the stain.

Dr. Hoff. The trouble is that the dark stain from the oxyphosphate of copper penetrates too deeply to be removed by any chemical reagent.

Dr. Ames. Where the stain is not objectionable, the oxyphosphate of copper will do what no other cement will do.

As to the extent to which moisture should be removed from teeth,

when I say I advise against desiccation, I mean the literal drying of the tooth, such as is produced when the tooth changes in color many shades from the adjoining teeth. The peripheral measurement of a tooth will change under thorough desiccation, and upon being moistened again it changes to its original condition. So if an inlay were cemented to place in a desiccated tooth, something must break when it becomes moist again. Wipe the normally moist tooth with a solution of sodium carbonate; follow that with distilled water; remove the distilled water with a mere wipe of absorbent material, and then proceed with the application of the cement. I absolutely advise against the use of warm air, alcohol, chloroform or anything which will draw the normal moisture from the tubuli of the tooth. There is a greater chance for the cement to knit into the tubuli if normally moist than if the tooth is desiccated, just on the plan that you can run plaster of Paris better to a moist impression than you can to a dry one. The merest trace of the cement liquid applied to the tooth surface seems an advantage, but it must be a mere trace.

Dr. Ward. If you have water in the tubuli and wipe the cavity out with cotton, which is the more liable to be displaced by teasing in the cement, air or water? Will you get adhesion better with air there or with water?

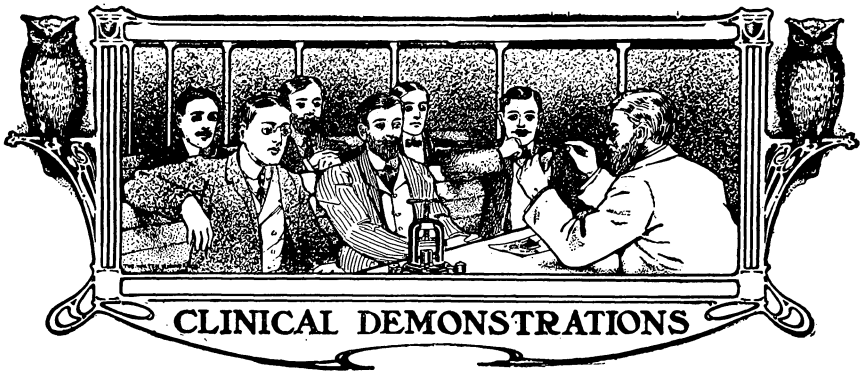
Dr. Ames. With water.

Dr. Ward. You get capillary attraction, and not adhesion.

Dr. Ames. By getting the cement more accurately adapted to the surface, as you will by having the surface normally moist, you will get whatever adhesion there is possible. I believe in providing for all mechanical knitting possible, and then if we get any of the peculiar molecular force, termed adhesion, we are that much ahead.

Dr. Hoff. The cement takes up the water itself.

Dr. Ames. Yes, there will be a trading off there. The cement will to an extent, I believe, enter the tubuli. There can not be a space because there is plenty of moisture coming from the opposite direction.



Clinics Before the New Jersey State Dental Society.

Technique for Taking Plaster Impressions for Orthodontia.

By George B. Palmer, D.D.S., New York City.

In taking an impression care should be exercised to select a sufficiently large tray, one that will allow at least one-eighth of an inch of plaster over the buccal surfaces of the molars. Those known as the Angle trays are best suited, as they are much higher than the ordinary tray, and can be bent to conform to the case in hand.

The teeth should be thoroughly cleansed and the membrane freed from mucus by wiping with cotton. French's impression plaster is dusted into water heated to 98° F. and allowed to settle, when the surplus water should be poured off to get rid of all hard particles. Do not stir or use anything to hasten the setting.

For the upper impression the plaster should be placed in the tray, flush with the rim, leaving the vault of the tray free from plaster, while the greatest amount is in the anterior portion, extending over the edge on to the handle. Place the tray in the mouth, have the patient close the teeth sufficiently to steady the tray and bring the plaster in contact with the occlusal surface of the teeth. Raise the lip and carry the plaster that extends over the rim on the handle of the tray, carrying high up with the index finger and back over the buccal surfaces of the molars.

The tray is now forced up evenly until all points touch. The teeth will displace enough plaster to flow over the vault and thus give a perfect impression of that part. The whole mass is steadily supported with the

index finger until it becomes thoroughly set; the harder it gets the more perfect will be the result. The tray is now taken away, leaving the impression in the mouth. All small, loose pieces should be taken out with liberal pieces of cotton in the foil carrier. Grooves are then cut parallel with the cuspids, but not quite through. Pry with the point of a knife and dislodge the front portion; then with the thumb and finger dislodge the lateral portions. This leaves the large piece covering the roof of the mouth which now may be easily removed. All pieces, as they are removed from the mouth, should be carefully placed on a clean piece of blotting paper—a great number of pieces does no harm, provided all are saved. After it is thoroughly dry the smaller pieces are put together with celluloid cement or liquid collodion and the larger with wax, and, if this is skillfully done, the line of union is hardly noticeable.

In a like manner the lower impression is taken, being careful to observe the essential points above mentioned, especially that of carrying the plaster (which has been built up and outside of the rim on the handle of the tray) well down between the cheek and teeth before forcing the tray home. When the plaster has sufficiently hardened, remove the tray and wipe out all small pieces of plaster with absorbent cotton. Coat with vaselin a piece of gauze about one inch square and place on the impression lingual to the incisors, and introduce new plaster to form an index of this surface. When hard remove this index and use it as a key when assembling the impression.

Dr. Gough, of Brooklyn, suggests drying that part of the lower impression with bibulous paper and using sandarac varnish instead of the vaselin.

Making Models.

By Dr. Frank A. Gough, Brooklyn, N. Y.

Dr Gough exhibited a set of impressions and models showing each step in the method of treating plaster impressions (such as Dr. Palmer was then taking) to produce accurate and artistically made casts. The several pieces of the impression are put aside on a piece of blotting paper to thoroughly dry for at least twelve hours, or if there is necessity for haste they can be artificially dried at once. These pieces are then carefully assembled and held in place with sticky wax, then coated with a thin coating of shellac and after an hour or so given another coat,

then again in another hour a thin coat of sandarac is given, half an hour later the impression may be poured. It should be first placed in water and allowed to remain two or three minutes. While the impression is soaking the plaster is prepared by sifting it into the water until all but about a quarter of an inch of water remains unabsorbed by the plaster.

An artist's sable brush is then used to work the plaster into the tooth indentations; then a spatula may be used to fill up the rest of the impression. The excess of water remaining is then poured from the bowl and the plaster put on a glass slab and the impression inverted and placed into it so as to form a cast with a well-formed base.

The next day the cast is separated from the impression by grooving the impression so as to remove small squares of the impression at a time. The impression having been removed, the casts are now trimmed to a symetrical form as suggested by Dr. Angle. For more minute details regarding this fascinating work, would suggest the reading of an article by Dr. Alfred P. Rodgers, published in the ITEMS OF INTEREST for September, 1906.

Orthodontia.

By DR. V. H. JACKSON.

Dr. Jackson demonstrated his system of orthodontia and orthopedia of the face.

Models were presented of two cases of prognathism, showing the conditions before and after treatment. In each case the features in the region of the upper maxilla needed to be made more prominent. The conditions were corrected by removable equalizing devices, in effect jumping the bite backward.

Models of two cases requiring the opening of the bite for the correction of extreme irregularity of the teeth, and for depressing elevated incisors were exhibited with apparatus used. The models showed the extreme movement of the teeth with but a few visits. Dr. Jackson demonstrated how easily the bite can be opened in a few moments for assisting the movement of the teeth when required. Cases presented showed the attachment of a metal shelf to the appliance back of the upper incisors for the depression of lower incisors through occlusion; also the opening of the bite on one side of the arch by extending metal

over the grinding surface, to permit the free movement of the molars, bicuspids and cuspids on the opposite side. Apparatus for causing the unilateral expansion of the arch, made by connecting to the appliance on the side of the arch not to be moved a flange made of plate metal, rising above the grinding surface about three-sixteenths of an inch to rest on the palatal side of the teeth of the opposite arch in occlusion.

Models of the case of a child aged four years with appliances for expanding the upper arch laterally and the lower arch laterally and anteriorly.

Models with apparatus showing the extensive movement in the expansion of the upper and lower arches, where the cuspids on one side of the arch were too prominent, the lateral incisors resting against the first bicuspids.

Many other models with appliances were shown for the correction of various forms of irregularity, including the rotation of the cuspids, bicuspids and molars.

Bridge Work and X-Ray Work.

By Dr. Richard Blum, New York.

Dr. Blum exhibited a removable bridge, composed of a saddle supported mesially by an upright piece of clasp metal fitting into a slit cut into a gold inlay which was cemented into the anterior tooth. The distal attachment of the saddle is a Griswold spring fitted in a box soldered into a gold inlay and cemented into the posterior tooth. The teeth used on the bridge are S. S. W. diatoric, which are cemented into boxes of pure gold soldered to the saddle.

An original device for examining dental X-ray negatives consists of an asbestos lined wooden box—about 12x5x6 inches—the top of which is an opal glass plate. This glass top is painted black, leaving a bare space in the center about the size of the average dental radiograph. The box contains two incandescent globes to illuminate the oblong space, which globes are controlled by a rheostat outside of the box to govern the amount of light necessary to bring out a greater or lesser density of the film to be examined.

A new envelope for dental X-ray films consists of a sheet of black photographic paper immersed in a solution of rubber and carbon bisulphite, which forms an adhesive and waterproof coating. After wrap-

ping the film in paper thus coated, lycopodium is sprinkled on the outside to remove stickiness. Being less bulky, the envelope is more readily adaptable in the mouth, and being thinner than the usual envelopes, the negative is subject to less distortion. At the same time it is light and waterproof.

A Simple Method of Making Gold Inlays.

By Raymond Adair Albray, D.D.S., Newark, N. J.

The cavity is prepared along recognized inlay lines.

An impression of the cavity is taken in the No. 30 rolled gold foil, the foil being pressed into place with pieces of spunk or chamois.

While this matrix is still in position, I pack Watts's gold into it (using a fairly heavy hand pressure and large plugger points) to the contour I want the finished inlay to be.

This is then lifted from the cavity (care being taken not to change its shape), and invested in powdered asbestos in the pan which comes with the Jenkins porcelain inlay outfit. The flux, a saturated aqueous solution of borax, is painted over the surface of the gold and small pieces of 20 k. solder are placed on it. The whole is then placed in the gas furnace and heated until the solder flows, more solder being added if necessary.

The inlay can be roughly finished with plug finishing burs or disks before cementing it into place and the final polishing left until a future date.

Carving Cusps for Gold Crowns.

By Thomas F. Martin, D.D.S., Rahway, N. J.

After fitting the band, take plaster impression of it in place, also the bite for occlusion, then wax up the cusps to occluding surfaces, using Dr. Parr's fluxed wax.

After getting the impression of the cusps in moldine, make a die of Mellotte's fusible metal (it is well to use a little dry plaster over the wax to prevent sticking when taking the impression for the die).

In swaging start first with a soft pine block to prevent the gold from tearing, also use a piece of cloth between the lead and the gold while swaging.

After bringing out the cusps, fit the band to the same, keeping the crown articulated until it is ready to solder, in this way allowing for the thickness of gold; the crown is then ready to finish and set without grinding away the cusps.

Porcelain Inlays.

By Dr. Joseph Head, Philadelphia, Pa.

Dr. Head put in two approximal porcelain fillings between the two upper central incisors, for the purpose of demonstrating the method of overcoming the shadow cast by the cement; he also put in a porcelain filling in a labial cavity at the margin of the gum of one of the incisors for the purpose of demonstrating the ease with which a platinum matrix can be burnished without lancing the gum. The principle lay in the fact that a large portion of the platinum foil extended well up on the gum above the tooth which, when it was pressed down in the cavity, formed an arch of platinum that forced the edge of the gum back from the cavity margin.

Pyorrhea.

By Dr. R. G. Hutchinson, Jr., Brooklyn, N. Y.

This clinic showed the treatment of pyorrhea. Dr. Hutchinson demonstrated the treatment of pyorrhea by the surgical removal of calcareous deposits from the roots of the teeth affected, followed by flushing the pockets with peroxid of hydrogen and the use by the patient of an antiseptic mouth wash.

In the course of his clinic Dr. Hutchinson remarked that the degree of success attained depends entirely on the thoroughness with which the operation is performed, and that many cases are regarded as incurable on account of the failure of the operator to go deep enough into the pockets and so thoroughly remove deposits.

Orthodontia—Technique of the Jackson System.

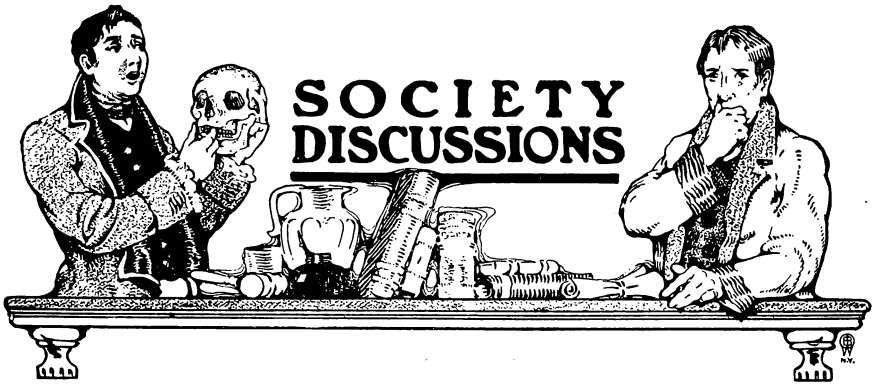
By Dr. C. W. B. Wheeler, New York City.

The demonstration explained the method of constructing an appliance after the Jackson system. A model was prepared by carving the teeth slightly at the necks, partial clasps of 18 k. gold (No. 36 gauge) were cut, contoured to fit the sides of the teeth and roughened on the side where the solder was to be applied. Spring clasps and springs were made of silver-nickel wire, the base wire being of German silver.

Gold, platinoid or German silver wire may be used.

The parts were placed on the model and held for a soldering by means of pins and mouldine. Soldering was done with the soldering iron, using chemically pure tin, and muriate of zinc as a flux.

The manner of applying force scientifically by means of a chart or tracing of the appliance was shown.



Second District Dental Society.

November Meeting.

The regular meeting of the Second District Dental Society was held November 11th, at the Kings County Medical Rooms. After the transaction of routine business, the president, Dr. Hutchinson, introduced the essayist of the evening, Dr. Henry H. Tompkins, of Utica, N. Y., who read a paper describing his method of making all-porcelain crowns without the use of solder. The following is the discussion:

Discussion.

Dr. John A. Schmidt. We are indebted to Dr. Tompkins for coming to us from a distance and presenting this interesting paper. The charts and models make each step of his methods clearly and readily understood. Certainly this method is an advance in the porcelain art, and commendable to all.

It was my pleasure to call upon Dr. Tompkins during the early fall. Several patients were present with this class of work, which he kindly permitted me to examine. I have never seen more beautiful crown work. The entire absence of irritation of the gums, the absolute joints, the translucency of the crowns, and the shading done to a nicety. You can readily understand that the less metal there is present to contract, the less shrinkage will occur and the less will be the tendency to checking.

I heartily agree with what the essayist has said regarding the advantages of the all-porcelain crown over all other forms of back and solder crowns. Where great stress is brought to bear the back and solder crown is, in my opinion, the stronger crown. But owing to the

backing we lose translucency. The tendency to checking can be avoided to a great extent, by using pure gold of gauge 34 as a backing. This pressed to the porcelain facing, by means of a water bag used in the Brewster press, gives absolute contact.

The Logan Crown. We are all aware of the difficulty in making an exact joint with the ready-made crown. With the Logan crown, owing to the platinum post, we are able to bake a porcelain joint, by the use of pure gold, or platinum disc, burnished or swedged into place, then forcing the pin through the disc, getting the crown into proper position, then withdrawing crown and disc and baking. The objection to this crown is that the pin is too soft.

Some time ago, I urged the manufacturers to incorporate a sufficient amount of irridium to overcome this objection. I was told that the crown was evidently a satisfactory one, as it sold well. This post is grooved and serrated in a manner that is of no use to us. And as it usually is necessary to reduce the upper fourth in diameter, or take a chance of perforating the root, the post is further weakened. A plain irridio-platinum post would answer our purpose, leaving us to shape it as would be suitable for the case. All have seen Logan crowns that are projecting from their original positions, with open joint in the rear, due to the pliability of the post. The ready-made crowns of composition posts are unsuitable for baking a joint, as the intense heat destroys the temper of and leaves a dark soft post, so that in order to produce good work, we are compelled to bake either using a facing or carving a crown. If a platinum solder is used, the high degree of heat drives the colors from the facing, with a great tendency to checking.

All-Porcelain Crowns. The fusing point of platinum solder is 2430° F. We have been taught that to fuse a porcelain body of a higher temperature than that of the soldering medium would cause fusing and evaporization of the soldering medium. I will pass around two specimens made in my laboratory to-day, showing that while theoretically this is true, practically it is a fallacy. In one case the irridio-platinum post is attached to the pins of the facing by pure gold, which, according to my pyrometer, fuses at 2000° F. In the other, 20 k. gold solder is used, this fusing at 1700° F. Both of these were backed by S. S. White medium fusing porcelain, which, according to the same pyrometer, fuses at 2100° F. Three bakings were given in each case, the heat being gradually and carefully carried in first two bakings to a biscuit; the third to a glaze. I placed these specimens on an anvil, using the sharp edge of a riveting

hammer with repeated blows, to see if I could break the porcelain at its attachment with the porcelain facing, which I was unable to do, the fracture occurring in the facing. You can readily understand this is a great point Dr. Tompkins could make use of in advocating his style of crown. I finally fractured at the point of soldering. In the specimen where pure gold was used, you see that it remains bright and intact. Where the 20 k. solder is used, you will notice that some of it remains, and that there is a small space showing that evaporization has taken place. Had 22 k. solder, which fuses at 1820° F., been used, no evaporization would have occurred. The main point is, great care should be used in bringing the heat up slowly to the fusing point. I have made these experiments and given you the result.

This is entirely new to me, and against all our teachings. I know you would doubt my statements were I not able to produce the results you have before you. I wish to state that before soldering I had etched the facing with hydrofluoric acid, and you can see from the specimens the strength of the union between the medium fusing porcelain and the facing. I have made crowns by bending the pins about the post, having first etched the facing, doing this to prevent the high heat of the platinum and its results. But since my experiments I know what can be done with a lower soldering medium, and the benefit of using the medium fusing S. S. White porcelain. But Dr. Tompkins's methods should give us even a more translucent crown. His method of preparing the roots for cap and half-band if desired, is simple and very effective. The preparation of the labial facing of the root, together with his grooving, locks the crown exactly into the position intended. While at Dr. Tompkins's office, I saw two cases of orthodontia, the lateral incisors standing within the arch, which he had corrected by an improvement on the Bonwill method of extension. The gums presented a healthy appearance, and the correction was perfect. To handle this work according to the Doctor's method, seems to require a loosely fitted post, thereby losing the advantage of a snugly fitted one.

I see no advantage in doing this work in the mouth, while the essayist claims great waste of time in making models. Yet the time required in raising the heat of the furnace and gradual cooling for each bake, requires an hour or more. In this busy city we are compelled to consider the patient's time. I prefer to turn my impression, with pin and cap in position, to my assistant, either dismissing the patient or to do other work in the mouth while the crown is being baked.

In regard to crowning, instead of extensive inlay contour restoration, I agree with the essayist. If the pulp must be removed, the break

involving half of the crown, by all means crown. But there are cases involving only a fourth of the labio-approximal surface, taking in much of the lingual surface, the bite being such as to endanger porcelain inlay. Here a cast gold inlay will give service for many years, which can ultimately be replaced by a crown. I trust you will all try Dr. Tompkins's method, and hope you will find it worthy of adoption. Let us break away from the ready-made crowns, or compel the supply houses to give us something better. I dislike a ready-made article of any kind, and have endeavored for some time not to use ready-made crowns. And, as the essayist has stated, for good work their use is limited.

Dr. F. T. Van Woert. This is the most practical talk I have listened to in a long while. The question has been raised as to the possibility of the ready-made crowns having strength. I had supposed that the reason such crowns were stronger than those made by dentists is because of the pressure which I had supposed was put upon stock crowns. Dr. Tompkins has practically disabused my mind of that theory

But the question presents itself as to whether we can get as strong a crown as the trade stock crown.

I believe that any porcelain—Jenkins, for instance—can be so baked that it will give ample strength. You can properly fuse any porcelain if you give it time enough. The breakage is due to the fault of the operator entirely.

The application of the facing on the tooth and his treatment of the pins in the teeth are entirely new to me, and I shall promptly try it. I believe from the lucid description Dr. Tompkins has given that there is a great deal more in this than in any method I have heard of in a long time, and I trust, gentlemen, that we shall try to get out of the porcelain all that he claims for it.

Dr. E. H. Babcock. I had the pleasure of examining some of the work shown here before the meeting, and I for one appreciate the beauty of it—the perfection of contact and the perfection of finish.

I think that the description has been very lucid and will enable any one who has handled porcelain to improve upon his work very much.

I think the suggestion of using shellac is also of great benefit many times, especially in drawing a matrix—drawing it in place. Referring to Figs. 2 and 3, the essayist spoke of the weakness of crowns so constructed—and that there is too much metal and consequently less amount of porcelain. I agree with him emphatically.

I have another point, and that is, in a great many cases in fastening the pins of the tooth to the pins of the crown, the solder is not sufficiently high grade, and even with a high grade, when you come to put a high fusing porcelain on that, the gold or alloy in the solder throws off gases, and that makes the porcelain more or less porous.

Another question equally as practical is the use of bands. The essayist said that to derive the greatest benefit from the bands they should be carried up to the apex.

I am a believer in bands; when you put great stress upon the crown it may split the root, and the band tends to overcome that tendency. Also, because it protects the cement from the oral fluids.

Dr. Hillyer. I doubt very much whether there will be any more washing away of the cement from that joint than with any well-made inlay. As to the strength of the attachment, Dr. Tompkins, has that groove been made upon any other crown?

Dr. Tompkins. Not that I know of. I wish to express my thanks for your appreciation of what I have said to-night.

I will try to answer one or two questions that have been asked.

Someone asked me how thick a platform should be used. Thick enough so as to stand ordinary manipulation.

Dr. Schmidt was kind enough to make an experiment showing the strength of the adherence of the porcelain with the facing. It is true, you can strike it with a hammer.

Now, if any one prefers to take a model and make this crown in the laboratory, it may be done; then I suggest discarding the soldering of the pins; it takes about an hour to fuse the solder and to allow it to cool down.

A Member. How long does it take to fuse the porcelain which you use to hold the facing in place?

Dr. Tompkins. It takes as much as an hour to do that.

Dr. Babcock. I notice in your work you cut off the pins. Would it not be an advantage if the manufacturers would place facings on the market without any pins?

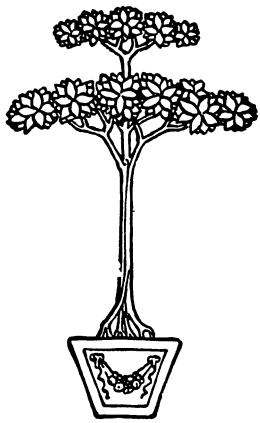
Dr. Tompkins. That gives me an opportunity to say, I think not. I tried to get them to do it, and since that they have made quite a number. I believe now that the pin is worth its price just as a means of holding the facing while grinding that porcelain.

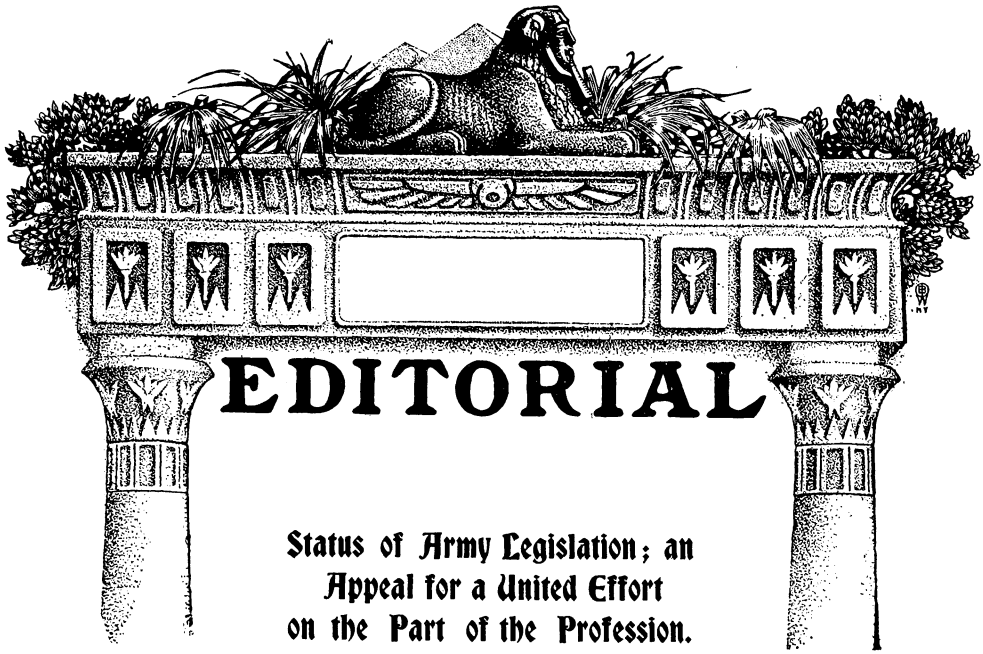
A Member. How do you repair them when they break off?

Dr. Tompkins. A broken crown does not disturb me, because you can pull it off with the little giant pin pullers. I simply cut around the pin, cut away the platform cap and leave the post in position. Now in this stage I would go on and make a crown as I did in New York by first making a small platform tube to fit over the pin. Then cut the letter X in the platform metal and push that over the tube, conforming it to the root end; the laps are turned up around the tube; then solder these and return to the mouth and re-burnish the platform. Then proceed as I have shown to-night and cement over the post.

On motion, a vote of thanks was tendered Dr. Tompkins for his most valuable paper.

Meeting then adjourned.





EDITORIAL

Status of Army Legislation; an Appeal for a United Effort on the Part of the Profession.

Since our last issue a bill establishing an officered Army Dental Corps has passed the Senate. Senator Bulkeley first introduced a measure, as an amendment to the Army Medical Bill, but the Senate Military Committee opposed the attaching of the Dental Bill to the Medical, and recommended that Senator Bulkeley should report his amendment as a separate bill (the Dental Bill which passed the Senate at the last Congress). This was done, and the Senate has promptly passed the bill. It is now awaiting consideration at the hands of the Military Committee of the House. The bill is published herewith.

This bill (Senate Bill 4,432) is one on which the entire dental profession can safely unite. It provides that dentists shall have status, and all of the present Contract Corps are eligible. Moreover, it has passed one branch of Congress. It is desirable, therefore, that the Military Committee of the House should favorably report this bill exactly as it passed the Senate, and every dentist who reads this, and who is personally acquainted with his Congressman, more especially if that

Congressman is a member of the Committee on Military Affairs, is urged to write without the delay of one day, urging the passage of Senate Bill 4,432.

If within a week of the appearance of this issue the members of the Committee on Military Affairs, and other Congressmen, should receive about ten thousand letters from dentists recommending action along the lines above outlined, the cause would probably be won. It is especially requested that College Faculties and Examining Boards should send petitions in favor of this bill. Wherever a dental society meeting may be held a similar petition should be prepared, signed by all in attendance and forwarded to Washington. Above all, waste no time.

Committee on Military Affairs.

Subjoined is a list of the members of the Committee on Military Affairs and their addresses in Washington:

Hon. John A. T. Hull, chairman, Iowa; 1232 Sixteenth Street, Washington, D. C.

Hon. D. R. Anthony, Kansas; 2158 California Avenue.

Hon. Thos. W. Bradley, New York; The Highlands.

Hon. Robt. F. Broussard, Louisiana; Riggs House.

Hon. James F. Burke, Pennsylvania; 2306 Massachusetts Avenue.

Hon. Adin B. Capron, Rhode Island; The Cochran.

Hon. Beman G. Dawes, Ohio; House of Representatives.

Hon. Geo. W. Gordon, Tennessee; House of Representatives.

Hon. James Hay, Virginia; House of Representatives.

Hon. Elias S. Holliday, Indiana; House of Representatives.

Hon. Julius Kahn, California; The Normandie.

Hon. R. Wayne Parker, New Jersey; 1723 Rhode Island Avenue.

Hon. Geo. Prince, Illinois; 3113 Thirteenth Street.

Hon. Isaac R. Sherwood, Ohio; Congress Hall.

Hon. James L. Slayden, Texas; 1631 R Street.

Hon. Fredk. C. Stevens, Minnesota; The Cairo.

Hon. William Sulzer, New York; 131 B Street, E. E.

Hon. Aristo A. Wiley, Alabama: Metropolitan Hotel.

Hon. H. Olin Young, Michigan; The Normandie.

60TH CONGRESS, 1ST SESSION.

S. 4432.

IN THE HOUSE OF REPRESENTATIVES.

JANUARY 30, 1908.

Referred to the Committee on Military Affairs.

AN ACT

To reorganize the corps of dental surgeons attached to the Medical Department of the Army.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to the Medical Department of the Army there shall be attached a corps of dental surgeons, which corps shall not exceed in number the actual requirements nor the proportion of one to one thousand authorized by law for service in the Regular Army, and all original appointments to said corps shall be made to the rank of first lieutenant.

SEC. 2. That the appointees must be citizens of the United States, between twenty-two and thirty years of age, graduates of standard American dental colleges, of good moral character, and of unquestionable professional repute, and shall be required to pass the usual physical examination and a professional examination which shall include tests of skill in practical dentistry and of proficiency in the usual subjects in a standard dental college course: *Provided,* That dental surgeons attached to the Medical Department of the Army at the time of the passage of this Act may be eligible to appointment, three of them to the rank of captain and the others to the rank of first lieutenant, on the recommendation of the Surgeon-General, and subject to the usual physical and professional examinations herein prescribed: *Provided further,* That the professional examination may be waived in the case of dental surgeons whose efficiency reports and entrance examinations are satisfactory to the Surgeon-General; and the time served as dental surgons under the Act of February second, nineteen hundred and one, shall be reckoned in computing the increase service pay of such as are appointed under this Act.

SEC. 3. That the pay, allowances, and promotions of dental surgeons shall be fixed and governed by the laws and regulations applicable to the medical corps; that their right to command shall be limited to the members of the dental corps; that their right to promotion shall be limited to the rank of captain after five years' service and to the rank of major after ten years' service: *Provided,* That the number of majors shall not at any time exceed one-eighth nor the number of captains one-third the whole number in the said dental corps.

SEC. 4. That the Surgeon-General of the Army is hereby authorized to organize a board of three examiners to conduct the professional examinations herein prescribed, one of whom shall be a surgeon in the Army, and two of whom shall be selected by the Surgeon-General from the contract dental surgeons eligible under the provisions of this Act to appointment to the dental corps.

SEC. 5. That the annulment of contracts made with dental surgeons under the Act of February second, nineteen hundred and one, shall be so timed and ordered by the Surgeon-General that the whole number of contract and commissioned dental surgeons rendering service shall not at any time be reduced below thirty.

Passed the Senate January 29, 1908.

Attest: CHARLES G. BENNETT,
Secretary.

SOCIETY ANNOUNCEMENTS

National Society Meetings.

American Dental Society of Europe, London, England, beginning July 31, 1908.

American Society of Orthodontists, Washington, D. C., November 2, 3, 4, 1908.

National Association of Dental Examiners and the National Association of Dental Faculties, Back Bay, Boston, Mass., July 24, 25, 26, 1908.

National Dental Association, Boston, Mass., July 28, 29, 30, 31, 1908.

Southern Branch of the National Dental Association, Birmingham, Ala., May, 12, 1908.

State Society Meetings.

Alabama State Dental Association, Birmingham, Ala., May 12, 1908.

Arkansas State Dental Association, Little Rock, Ark., May 26, 27, 1908.

Connecticut State Dental Association, Bridgeport, Conn., April 21, 22, 1908.

District of Columbia Dental Society, Baltimore, Md., June 4, 5, 6, 1908.

Florida State Dental Society, Tampa, Fla., May 21, 22, 23, 1908.

Illinois State Dental Society, Springfield, Ill., May 12, 13, 14, 15, 1908.

Indiana State Dental Association, Indianapolis, Ind., June 4, 5, 6, 1908.

Maine Dental Society, Lewiston, Me., July 1, 2, 3, 1908.

Maryland State Dental Association, Baltimore, Md., June 4, 5, 6, 1908.

Minnesota State Dental Association, St. Paul, Minn., June 8, 9, 10, 1908.

Nebraska State Dental Society, Omaha, Neb., May 19, 20, 21, 1908.

New Jersey State Dental Society, Asbury Park, N. J., July 15, 16, 17, 1908.

New York State Dental Society, Albany, May 7, 8, 9, 1908.

North Dakota Dental Association, Devils Lake, N. D., May 12, 13, 14, 1908.

Northern Indiana Dental Society, Fort Wayne, Ind., September 8, 9, 1908.

Ohio State Dental Society, December, 1908.

Pennsylvania State Dental Society, Philadelphia, Pa., June 30, July 1, 2, 1908.

South Dakota Dental Society, Lead, S. D., July 22, 23, 1908.

Southern Illinois Dental Society, Greenville, Ill., October 27, 1908.

Southern Wisconsin Dental Association, Platteville, Wis., May 27, 28, 1908.

Southwestern Michigan Dental Society, Jackson Society, Jackson, Mich., April 14, 15, 1908.

Texas State Dental Association, Dallas, Texas, June 11, 12, 13, 1908.

Vermont State Dental Society, Montpelier, Vt., May 20, 22, 1908.

Wisconsin State Dental Society, LaCrosse, Wis., July 16, 17, 18, 1908.

Odontotechnique Society of New Jersey.

The regular monthly meeting and banquet of the Odontotechnique Society of New Jersey will be held Thursday evening, March 5, at the Elks' Club, 37 Greene Street, Newark, N. J.

The paper of the evening will be read by D. A. Webb, M.D., of Scranton, on the subject of "Malignant Growths of the Jaw, Fractures," etc.

Stereopticon views will be used to illustrate the lecture.

JOHN A. VOORHEES, Journal Correspondent.

New Jersey State Dental Society.

The thirty-eighth annual meeting of the New Jersey State Dental Society will be held in the Auditorium at Asbury Park, N. J., commencing July 15 and continuing through the 16th and 17th.

The headquarters will be at Hotel Columbia with rates of $3.50 and $4.00 per day.

All reservations must be made before July 1.

Prominent dentists throughout the United States will give clinics and read papers, and the instructions and information gained at this meeting will be invaluable to the dentists attending.

The programme will be out the early part of June. Last year was the most successful in the history of the society, men prominent in dentistry from all over the United States and Canada being there. Registrations largest of any previous year. Cut off the week of July 13 and attend our meeting.

Other good hotels in Asbury Park are the Hotel Brunswick, The Fenimore, Hotel Monmouth, The Madison, The Knickerbocker, The Wellington, Sunset Hall, Hotel Colonial, where reasonable rates and good accommodations can be had.

CHARLES A. MEEKER, D.D.S., Secretary.

29 Fulton Street, Newark, N. J.

Massachusetts Board of Registration in Dentistry.

A meeting of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., March 4, 5, 6, 1908.

Candidates who have applied for examination will report to the secretary, Wednesday, March 4, at 10 o'clock a. m., at Tufts College Dental Infirmary, corner Rogers and Huntington Avenues, prepared with rubber-dam, gold, plastic filling materials and instruments, to demonstrate their skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished. The board in every instance selects the cavity to be filled. Partially prepared cavities never accepted.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown and bridge work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry and metallurgy, and will be held at Civil Service Rooms, State House, from Thursday, March 5, at 10 a. m., until Friday p. m., March 6.

All applications, together with the fee of twenty dollars, if first examination, must be filed with the secretary of the board on or before February 26, as no application for this meeting will be received after that date.

Candidates for second and subsequent examinations will be required to fill out an application blank (Form 2) and forward to the secretary as above.

Every candidate for examination must be twenty-one years of age.

Application blanks may be obtained from the secretary.

Temporary licenses are never granted.

The fee for third and subsequent examinations is $5.00.

G. E. MITCHELL, D.D.S., Secretary.

Office of the Secretary,
25 Merrick Street, Haverhill, Mass.

Minnesota State Board of Dental Examiners.

The next regular meeting of the Minnesota State Board of Dental Examiners will be held at the College of Dentistry of the University of Minnesota in Minneapolis on March 10, 11, 12, 1908. All applications must be in the hands of the secretary by February 25.

For further information address the secretary,

DR. GEO. S. TODD.

Lake City, Minn.

American Society of Orthodontists.

The next regular annual meeting of the American Society of Orthodontists will be held in Washington, D. C., on the first Monday, Tuesday and Wednesday of November, 1908.

FREDERICK C. KEMPLE, Secretary.

North Dakota State Dental Association.

The North Dakota State Dental Association holds its next meeting at Devils Lake, N. D., May 12, 13 and 14, 1908. A large attendance is desired.

O. H. SOSSAMAN, Secretary.

Missouri Board.

The State Board of Dental Examiners for the State of Missouri will meet in the Hall of Representatives in Jefferson City, May 25, beginning at 2.30 p. m. Applicants should come with instruments and material for both prosthetic and operative work, except vulcanizer. A diploma from a reputable college or a certificate from another board is essential to examination. The fee is ten dollars.

S. C. A. RUBEY, Secretary.

Clinton, Mo.

Iowa State Dental Society.

The forty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Ia., the 5th, 6th and 7th of May. Since the last meeting the State has been divided into districts and the society is in process of reorganization. The entire State has been covered by our superintendent of district societies, and each district organized. It is confidently expected that there will be upwards of six hundred dentists in attendance.

The clinical and essay programme promises to be unusually strong, even for this society. Every dentist owes it to himself, to his patients and to his society to be present. Dentists from other States will be cordially welcomed.

T. F. COOKE, Secretary.

Burlington, Ia.

Southern Branch of the National Dental Association—Alabama State Dental Association.

The eleventh annual meeting of the Southern Branch of the National Dental Association will be held in Birmingham, Ala., Tuesday, May 12.

The association has accepted the invitation to meet conjointly with the Alabama Dental Association.

A. R. MELENDY, President,
Knoxville, Tenn.

CARROLL H. FRINK, Rec. Secy.,
Fernandina, Fla.

Illinois State Dental Society.

The forty-fourth annual meeting of the Illinois State Dental Society will be held in Springfield, May 12, 13, 14 and 15, in the First Presbyterian Church. The sessions of this society will be held in the main audience room of the church, the clinics in the Sunday school room and the exhibits in the electric lighted half-basement. A special feature of the 1908 meeting will be an "exhibitors' clinic," which will be made part of the regular programme for the session on the morning of May 14.

ARTHUR D. BLACK, Secretary.

Lake Erie Dental Association.

The forty-fifth annual meeting of the Lake Erie Dental Association will be held at Hotel Rider, Cambridge Springs, Pa., May 19, 20, 21, 1908.

All reputable dentists are cordially invited to be present.

V. H. MCALPIN, Secretary.

Central Dental Association of Northern New Jersey.

The annual meeting of the Central Dental Association of Northern New Jersey was held on Monday evening, January 20th, at Davis' Parlors, Newark, N. J.

The principal business of the meeting was the annual election of officers, the following being the result of the election: President, C. F. Alfred Hane, D.D.S., Jersey City; vice-president, R. C. Fowler, D.D.S., Harrison; secretary, Edwin W. Harlan, D.D.S., 56 Madison Avenue, Jersey City; treasurer, Charles A. Meeker, D.D.S., 29 Fulton Street, Newark. Executive committee: S. C. G. Watkins, D.D.S., Montclair; M. R. Brinkman, D.D.S., Hackensack; Dr. Frederick W. Stevens, Newark; Dr. Oscar Adelberg, Elizabeth; D. G. Farrington, D.D.S., Caldwell.

The executive committee have the promise of several very interesting papers from prominent members of the profession for the coming season.

The annual banquet was held on Monday, February 17, at the Knickerbocker Hotel, New York. A good time was assured all who attended for the chairman of the dinner committee, Dr. Wm. L. Fish, had been working overtime to make this banquet surpass all preceding banquets of the association.

EDWIN W. HARLAN, Secretary.

Spokane Dental Society.

The Spokane Dental Society was organized in September, 1907, as a local society, and has held regular monthly meetings since that date.

The intention of the society has been to have a big meeting and clinics at the annual meeting in September each year.

If, however, the society becomes a component of the State society, which has adopted constitution and by-laws similar to the Illinois State Dental Society, the annual meeting will very likely be merged with the State meeting.

The officers are: W. H. Cumming, president; E. Wathington, first vice-president; H. J. Smith, second vice-president; H. C. Lambach, treasurer; F. B. Lynott, secretary, 214 Lindelle Block, Spokane, Wash.